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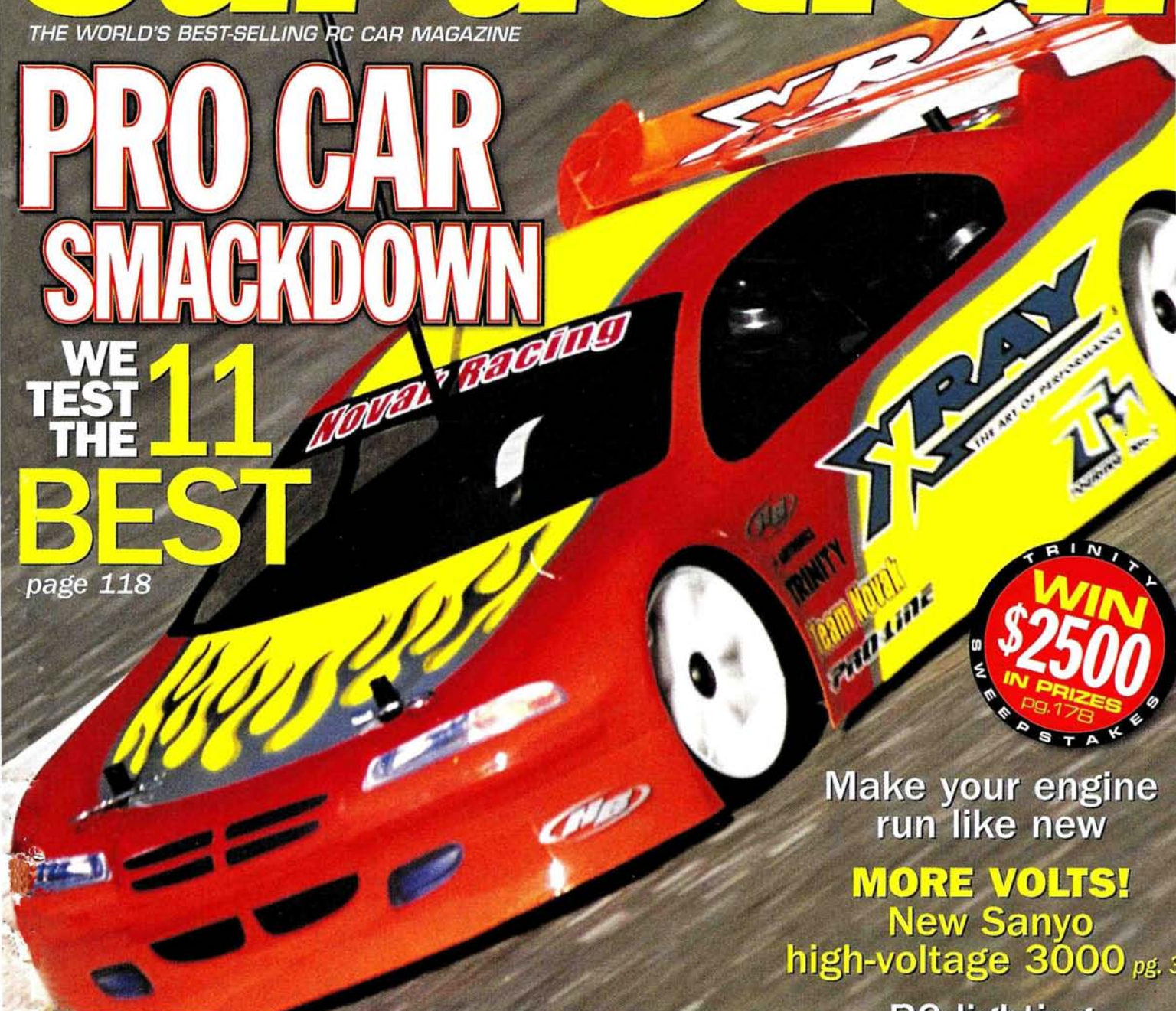
car action

THE WORLD'S BEST-SELLING RC CAR MAGAZINE

PRO CAR SMACKDOWN

WE
TEST
THE **11**
BEST

page 118



Make your engine
run like new

MORE VOLTS!
New Sanyo
high-voltage 3000 pg. 3

RC lighting
made easy

20 WAYS

to build a better kit

TESTED

Kyosho QRC Ram and Beetle ■ Tamiya TA04-R HKS Altezza
Megatech Nitro Razor XT ■ Dragmaster Funny Car and Pro Stock

DECEMBER 2001

AirAGE

USA \$4.95 Canada \$7.50



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Touring still on top

For this issue, we tackled our biggest competition-car shootout ever: the Pro Electric Touring Car Smackdown. With 11 cars in all, this was one gargantuan test. I'll let the article do the talking as to how the cars fared, but two things struck me about touring cars in general as we tore up the track.

The touring car scene is huge! I challenge you to name one other RC competition-car category in which there are 11 real contenders. Electric racing trucks? There are three: Losi, Associated and Kyosho. Electric buggies? It's the same suspects as the truck scene, plus Schumacher. Nitro racing? When Mugen releases its truck, there will be four serious entries. Five brands vie for 1/8-scale nitro buggy supremacy, while Serpent and Mugen are the "big two" in on-road. Why are touring cars still so incredibly popular? I think it's for the same reasons as they became popular in the first place: touring cars are "real" in that they reflect a more accessible full-scale experience. Granted, none of us drive Opels or Vauxhalls, but everybody understands and can relate to a good-looking sedan, regardless of the marque it's meant to resemble. And anyone can appreciate the appeal of adding trick aluminum widgets, aftermarket wheels, sleek bodies and the other goodies we use to personalize our cars. Or you can just buy the car with all the gee-whiz stuff already in place, which I feel accounts for much of the popularity of the top-of-the-line racing cars.

And they're all pretty good! While I do believe that many of the race cars sold never see a track or a transponder, the cars are nonetheless designed to race. And nothing builds a better car than race testing. Since Tamiya released the TA01 way back in the '90s, the development and improvement of RC touring-car technology have been relentless. From Yokomo's first YR-4 and the original HPI RS4 to the convention-busting designs of the Team Losi Triple-XS and Kyosho V-One R, touring car performance have ratcheted forward with each new machine. There simply isn't room for lesser cars. To be certain, some are better than others, but the market today just won't tolerate a bona fide loser. Competition on the track and on the retail shelf is what has brought us the incredible cars we enjoy today. So enjoy them!

Peter Vieira
Executive Editor

BACKYARD FLYER

Change is in the air—literally! Radio control airplanes are now lighter, smaller, more durable and easier to fly than ever. These aren't big wood-and-covering models that take months to build and require a minivan to transport them to a flying field; the new breed of planes can fly in a schoolyard, your backyard, or even your living room! And thanks to electric power, modern materials and plug/snap/screw-together assembly, the experience of building a plane is now much more like building an RC car than tackling a carpentry project. With this new type of RC flight in mind, the publishers of *Radio Control Car Action* have launched *Backyard Flyer*—a magazine dedicated to the growing small-airplane scene. Whether you're an experienced RC pilot or just starting out, *Backyard Flyer* will keep you informed, excited and airborne. Join the revolution!



Join the Club

Your mag is what introduced me to this hobby; I saw it on the stands and said, "Oh, why not?" When I sat down and read it, I found out that RC is really cool! I scratched and saved until finally (with a little help from my parents), I was able to get my first truck—a T-Maxx. When school started, I took it to play with on the running track. I have never seen so many people look at something in my life. Since then, we have started an RC program at our school, but we haven't yet found any sponsors to really get it moving. If anyone can help, it would be greatly appreciated. Thanks a lot! [email]

Terry
cheatham_terry@hotmail.com

I think it would be cool if RC manufacturers offered special package deals or bonuses to school-based RC clubs, as Estes does with model rockets. Get one of your teachers (probably the shop-class guy) to be your official school sponsor, and see what you can put together! This is just the sort of thing Chris Chianelli would love to put into "Back Lot," so keep in touch.

—Pete

Lightning Strikes

In the June 2001 issue, you tested the Team Losi Triple-X Kinwald Edition with really trick graphics on it. Where can I get those killer lightning stickers? I've tried several hobby shops, but nobody knows where to get them. Please help! Thanks. [email]

Bob



Actually, those lightning bolts are painted on, so there are no stickers to find; sorry! If you would like to get a body painted with the same graphics, contact Bill Zegers at rcpaintman@aol.com; he painted our Triple-X KE, and he can do the same for you.

—Pete

With a Crowbar and Duct Tape, that's how

I wonder how the Hitec RCD Spectra module fits and works in the Airtronics M8. I had a friend who put them together, but he no longer races. [email]

Matt Gould

I can guess why your friend doesn't race anymore. The Spectra module doesn't fit the M8. Maybe you could cut up the M8 and hack-rig some way of installing the module, but you would then have two voided warranties on some very expensive electronic gear, and the result would likely be a truly hideous Frankenstein of a transmitter that doesn't work. Get an M8, or get a Lynx 3D, but don't try to combine them!

—Pete

Job Hunting

My name is Nick, and I'm a 14-year-old looking to find a career in something I love to do. After a few years of thinking, I have found RC is definitely what I love. There are a

few problems, though. I can't find any information on what I need to know or where I need to go to learn it. So I'm asking you for help in pointing me in the right direction. I know my way around an RC car pretty well; I would just like to get paid for it.

Nick
nick_g_404@hotmail.com
Vermontville, MI

Retail is easiest and the first logical step. See whether the local hobby shop owner will let you help out after school. If he says no, tell him you'll do it for free; and when he realizes that you're useful to have around, he can start paying you then.

Working in a shop (and reading *Radio Control Car Action*) will quickly make you an RC expert. After high school, you can study engineering and design if you hope to work on the manufacturing side of the hobby, or you could study communication and journalism to become a contributor to *RC Car Action*, or you could concentrate on marketing and advertising to back into the industry from the advertising side.

If you set a goal for your life now, you will be much more successful much sooner than someone who goofs off in school and doesn't form a plan until he graduates from high school or college and realizes he has no idea what to do next. I have a feeling you'll do just great.

—Pete

Sub Trubs

I got sick of the bookstore selling out of *Radio Control Car Action*, so I subscribed, but after seven issues, I'm already getting renewal notices. Don't I get 12 issues? If I renew now, will I get duplicates? I mean, I like the mag and all, but I don't need two of each month's issue. I sure don't want to pay for two! [email]

Bradley Rellfs

I don't usually run letters regarding circulation questions here in "Readers Write"; instead, I forward them to the circulation guys so they can deal with them. But I decided to run your letter to call everyone's attention to the new Customer Service section that will appear from now on in every issue of *RC Car Action*. This month, it's on page 273; the section will always be listed on the contents page under "Resources." And to answer your question: yes, you will be sent a full 12 issues; and no, you won't get duplicate issues if you renew now, but you can be sure of a further year of issues. Thanks for your support!

—Pete

YOU SAID IT Wouldn't it be cool if there were RC dirt bikes?

I loved the Track Test of the Nuova Faor SF501! This is the most awesome RC piece I have ever seen. The chain on the Nuova Faor is awesome! I ride motorcycles, and I can't tell you how cool it is to see this action come to RC. Wouldn't it be cool if there were RC dirt bikes, too? Think about having a scale RC dirt bike with a gas engine and Lexan plastic that you could paint the color you want and have choices among the major bike manufacturers? What if they even came out with a frame to match Honda's aluminum frame? The only RC dirt bike I have ever seen is the Tyco toy, and I heard it couldn't get off the pavement! I might be nuts, but I think RC bikes would be a huge plus to the hobby. [email]

JOSH GRAVES

Of course it would be cool! If only it were easy. As I'm sure you know from riding bikes yourself, just getting a motorcycle to steer requires significant body English. You can't just jerk the handlebar to the right to make a right turn, or the bike will fall over onto its left side. That's why getting an RC street bike to handle is a challenge; factor in jumps and uneven off-road terrain, and things really get difficult for a 2-wheel RC vehicle. I say, the heck with making the bike RC—what we really need is an RC rider, kind of like Kyosho's "Hanging On Rider" from a few years ago. All the bike needs is decent suspension and a throttle; the RC dude would operate on three channels (one to twist the bars left and right, one to make him lean left and right, and another to scoot him up to the tank or back toward the rear fender), and the throttle would be a fourth channel. Now that would be cool.

—Pete



You like the bike, you got the bike. I'm breaking the "We don't give away test vehicles" rule just for you, Josh.

WRITE TO US! We welcome your photos, drawings, comments and suggestions. Letters should be addressed to "Letters," Air Age Inc., *Radio Control Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606 USA. Letters may be edited for clarity and brevity, and each must include a full name and address or telephone number so that the identity of the sender can be verified. We regret that, owing to the tremendous numbers of letters we receive, we can't respond to every one.

EMAIL ■ Derek Buono: derekb@airage.com ■ Chris Chianelli: chrisc@airage.com ■ Bob Hastings: bobh@airage.com ■ Kevin Hetmanski: kevinh@airage.com ■ Steve Pond: stevep@airage.com ■ Peter Vieira: peterv@airage.com ■ Greg Vogel: gregv@airage.com



BY CHRIS
CHIANELLI



Sanyo crowned voltage king **SANYO 3000HV HIGH VOLTAGE CELLS**

NICKEL-METAL-HYDRIDE TECHNOLOGY broke the 3000mAh barrier, but the earliest 3000s were low on voltage compared with Ni-Cds. Panasonic's Stock Metal Hydride cells fixed that, and now the voltage war is on. Sanyo's latest salvo is the 3000HV (high voltage) cell, which is claimed to produce an average voltage of 1.138 (versus about 1.124). That might not sound like much, but remember, there are 6 cells in a pack, so the total voltage increase is almost 1/10 volt. It can make the difference between winning and ... not. Trinity will be first with the new cells in "Team" and "Race" spec VIS-Extra matched packs and stick packs

Peak goes
to H-E-double
hockey sticks

Peak Hellfire RS24 Rebuildable Stock Motor



Can't say how well the name will play on the Bible belt, but Peak's Hellfire rebuildable stocker looks fast. Orion/Peak-pioneered surface-mounted capacitors make installation extra easy, and the Hellfire will be offered in standard and "blueprinted" maximum-performance models. According to Peak, the Hellfire RS 24's dual-stack Power Tunnel armature has high-rpm characteristics that, when coupled with all-new super-strong G12 wet magnets, deliver maximum torque and rpm while maintaining high efficiency.

Peak Performance, 22601 La Palma Ave. #104,
Yorba Linda, CA 92887; (714) 692-8533;
www.peakmotors.com.



WILD WELD WHEELS



PRO-LINE VELOCITY 6 AND SUPER SINGLE MAXX WHEELS

Pro-Line has officially licensed the Velocity Six and Super Single designs from the full-scale wheel guys at Weld Racing. A special process is used to prevent the bright chrome finish from chipping, and both styles are offered in standard offset models. The Velocity 6 is also available in a 1/2-inch-offset version for increased stability.

Pro-Line, P.O. Box 456,
Beaumont, CA 92223;
(909) 849-9781; www.pro-lineracing.com.

KOOL IT! Trinity Nitro Coolers

Now, this is a good idea (I could have gone with the "cool idea" pun, but that would have been way too lame).

Trinity's team drivers discovered that the nitro tended to leach out of their fuel when it became warm when sitting out in the pits on hot days. Thus, the Nitro Cooler was born. In addition to the insulation of the silver "jacket," which also reflects heat and light, the Coolers include freezable gel packs to keep fuel chilly for maximum power.

Trinity Products Inc., 36 Meridian Rd., Edison, NJ 08820; (732) 635-1600;
www.teamtrinity.com.



Welcome Matt Trinity Matt Francis line

Trinity's star driver and known nice guy Matt Francis now has his own line of aluminum hop-up parts with a signature red-anodized finish. The Team Losi Triple-XS sedan is the first car to get the Matt Francis treatment, and many more parts are to come for Losi vehicles and other popular brands.

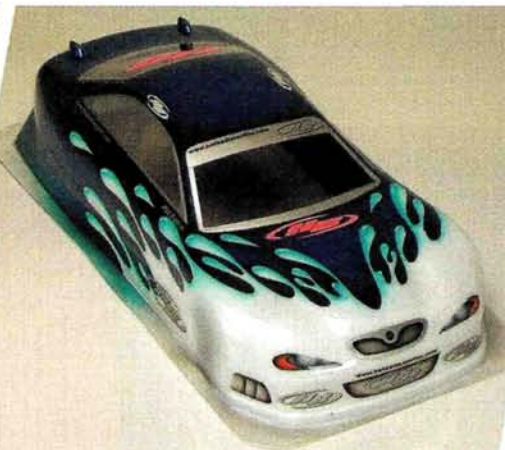


HOTTER BODIES

HB Racing Factory Painted Bodies

This is HB Racing's (aka Hot Bodies) new Mazda Millenium shell done up in a factory drip job. The artwork is real paint, not a printed graphic process. How do they do it? I don't know, but it looks killer. If you get a clear one to paint yourself, you'll be pleased to find photorealistic detail decals and logos, window masks and a separate wing. Nice.

HB Racing, 11318 South St., Cerritos, CA 90703; (562) 468-1121;
www.hotbodiesonline.com



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RC5897. \$36.99





SPOILER'D SPYDER, BALLISTIC BUG

HPI Toyota MR-S GT
200mm and VW Beetle
Cup Racer bodies

You can always count on HPI to be first with the hottest Japanese race bodies; the latest is the MR-S GT—the competition version of Toyota's MR-2 Spyder. The 200mm shell includes window trim, headlights, grills, taillights and complete racing logos. Overspray film and vinyl window masks

make it easy to produce a body that looks just like the picture you see here, and the rear wing is included, too.

The new Beetle Cup Racer body has those features plus the latest HPI innovation: pre-cut decals! Just peel and stick!

Finally! And the "Cup Racer" thing? It's a European racing series wherein the competitors run—you guessed it!—VW Beetles.

HPI Racing, 15321
Barranca Pky., Irvine, CA
92618; (949) 753-1099;
www.hpiracing.com



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MH4030T 30% Platinum Team Blend • \$36.99

Use for competition 1/8th racing, on and off-road



TRINITY

MOVING MODELS KYOSHO AUTO SCALE BODIES

No, these aren't die-cast models! The highly detailed Mercedes-Benz CLK D2 AMG and CLK Warsteiner AMG shown here are among Kyosho's new Auto Scale collection of bodies for the popular Mini Z. Each model includes a die-cast-quality, fully painted and detailed body, a complete set of wheels and tires, a dummy chassis (with secret compartment) and a display case. The AMG CLK bodies include functional wide rear and standard-width front wheels and tires, and the wheels are offset 3mm to widen the Mini Z's track by a full 6mm for extra stability. Kyosho's optional wheel locknuts are required, however, because of the wheels' deeply recessed hubs. Expect to see many other new bodies added to the Kyosho Auto Scale Collection.

Kyosho; distributed by Great Planes Model Distributors, P.O. Box 9021, Champaign, IL 61826-9021; (800) 682-8948; www.kyosho.com.



Faster, fatter foam Pro-Line Maxx Impact ultra-firm gray inserts

These "hard," low-rolling-resistance inserts were created in response to demand from Traxxas Maxx racers. The "Maxx Impact" ultra-firm gray inserts are made of high-density oversize foam and can be used with all Maxx-size tires, including road tires.

New looks for monsters, draggers and left turners 2002 Bolink Bodies

Bolink has been coming on strong with new bodies lately; check out the latest.

■ **Dodge Powerwagon.** This shell will turn your T-Maxx into a vintage military monster. I like it!

■ **T-Bird Pro Mod Dragster.** Old meets new with this latest drag-racing body. Along with Dragmaster, Bolink is rapidly becoming the big name in straight-line racing.

■ **High-Downforce Monte Carlo.** Say what you will about real Monte Carlos, but Bolink's RC version looks hot. It's shaped to better push the car against the track—just the thing for low-bank and no-bank ovals.

Bolink R/C Cars Inc., 420 Hosea Rd., Lawrenceville, GA 30045; (770) 963-0252; www.bolink.com.



NEW GLUES

Team Losi Tread Lock Thin, Pro-Line premium-blend CA



I've been into RC since forever, so I don't take good-quality CA for granted. It wasn't too long ago that tire shedding was a just a fact of RC life. No more! The latest glues are the best ever, but they still keep getting better.

Team Losi's very cool Tread Lock sticky stuff (complete with signature anti-spill, no-clog bottle) is now offered in a "thin" formula for better flow into tightly fitting tire and rim joints (plus many other non-tire applications). The red-label thin stuff has the same bonding strength as "classic" blue; it's just thinner and dries faster.

Pro-Line knows a thing or two (or two thousand) about tires, so it's no surprise that the tire giant has some top-quality CA, too. Pro-Line Premium Blend Team CA is available in thin and medium viscosities for all types of applications, and it features a new clog-free cap. I don't know about you guys, but my biggest CA mishaps occur when I'm wrestling with a clogged bottle. One minute you're working on your car; the next minute you're stuck to your car. And the bench. And your screwdriver.

Pro-Line, P.O. Box 456, Beaumont, CA 92223; (909) 849-9781; www.pro-lineracing.com.

Team Losi; distributed by Horizon Hobby Inc., 4105 Fieldstone Rd., Champaign, IL 61822; (217) 355-9511; www.horizonhobby.com.



Readers' Rides

Win a one-year subscription to Radio Control Car Action magazine! Send a sharp, uncluttered, well-exposed color photo of your vehicle (no Polaroids) and a brief description to "Readers' Rides," *RC Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606 USA. If we publish your photo, you'll receive a free, one-year subscription to *RC Car Action* and will be eligible to win the "Reader's Ride of the Year Contest." Write your address and phone number on your letter and on the back of every photo you send. Good luck!



John Rupp, Denver, CO Tamiya Blackfoot

Now that there's an RV that would make the Griswolds proud! If you can't recognize the truck through its disguise, this is actually an original Tamiya Blackfoot. John added working headlamps and a functional winch to the Ford pickup body. The camper was hand-crafted from balsa and then covered with iron-on model-airplane covering. For that finishing touch, John sewed his own curtains and added a functional rear door.

Bob Priestly, Clifton, NY Tamiya Mountaineer

Here's a classic off-road pickup that has been revamped for crawling duty. Bob added a custom 4-link suspension that incorporates Associated T3 shocks. The truck has a Novak speed control, Pro-Line Dirt Works tires and 10 Sanyo 2000mAh batteries on board. Bob tells us that it may not have a pretty paint job or cool aluminum parts, but its newfound agility more than makes up for its lack of "style" points.



Michael Triputi, Farmington, CT Tamiya Monster Beetle

It's hard to believe that this Monster Beetle was headed for the junk pile. Michael adopted the Bug from a friend and then painstakingly restored it after obtaining new servos, a BEC and a mechanical speed control. His efforts were obviously well worth it. Albert Attaboy rides again.



Tony Swanson, Minneapolis, MN Team Associated RC10T3

What could be better than having a fully decked out T3? Having two of them! Tony's flamed duo both feature Pro-Line Silverado bodies, a full metal complement from Lunsford, RPM bumpers, dust covers, ball ends and suspension mounts plus a GS Racing antenna mount and wire. Both have Futaba radio gear and a Tekin ESC.

Readers' Rides



Mike Dulian, Wadsworth, IL **HPI RS4-2 Racer**

We needed to have at least one glimpse of spring among our snowy selection of rides. Beneath this black HPI M3 body, Mike's TC has a 2-speed tranny, aluminum shocks, carbon shock towers, a brake disc, Robinson aluminum pulleys, HPI belt tensioners and Futaba radio gear. One of Mike's favorite things about his racer is how it looks power-sliding around a long, sweeping turn.

Aaron Talbot, Dayton, MD **OFNA Monster Blazer**

When you're looking for that first nitro vehicle, why not get the biggest thing you can get your hands on? That's just what Aaron did when he picked out his Monster Blazer. He's duly proud of his effort; it includes Hitec radio gear, an OFNA bump-start P4 engine, Monster Pirate rims and a Parma Blazer body.



Nick Capatanos, Lansing, MI **HPI Nitro RS4 MT**

This is Nick's first nitro-powered RC vehicle, and it's good to see that he gets year-round enjoyment from it. The RS4 MT is equipped with an HPI purple heat-sink head and a fiber disc brake as well as an MIP onboard temperature gauge. He powers the stock .15FE engine with 20-percent-nitro fuel. ■



Nick VandenPlas, Oneida, WI **Team Losi Triple-X Buggy**

If you happen to be at Dirt Heaven and Hobby Raceway in Oneida, WI, you might catch this nice-looking Losi Triple-X buggy. Nick painted the Pro-Line X-Factor body himself; beneath the shell lie Team Orion matched 2400 batteries, an LRP V7.1 speed control and a Hitec steering servo. The buggy is equipped with a Team Paradigm 12x3 motor.



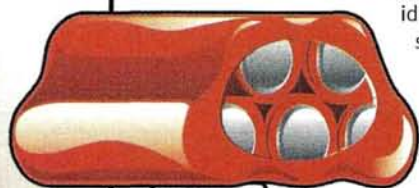
Pit Tips

ILLUSTRATIONS BY
DAVID BAKER

WIN AN OFNA YO-YO AND RC CAR ACTION SUBSCRIPTION! Radio Control Car Action will give a 6-month subscription (or extend an existing subscription) and an OFNA Yo-Yo to the author of each idea used in "Pit Tips." The "Top Tip" winners will also be considered for "Tip of the Year" to be selected at the end of each year. The "Tip of the Year" winner will receive an OFNA 0B4 Electric International RTR car kit. Send a rough sketch to Bob Hastings c/o Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606 USA. **BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT.** We're unable to publish many good tips because we don't have the sender's name and address. Please note: because of the number of ideas we receive, we can neither acknowledge every one nor return unused material.

Spring Compression Check

Have you lost your spring-rate chart and want to identify the stiffness of your springs? Weight the spring with a heavy item (such as a battery pack), and then measure how far the coils are compressed under a load. Springs rated lighter will be compressed more than heavier ones.
*Peter Wah
Trenton, NJ*



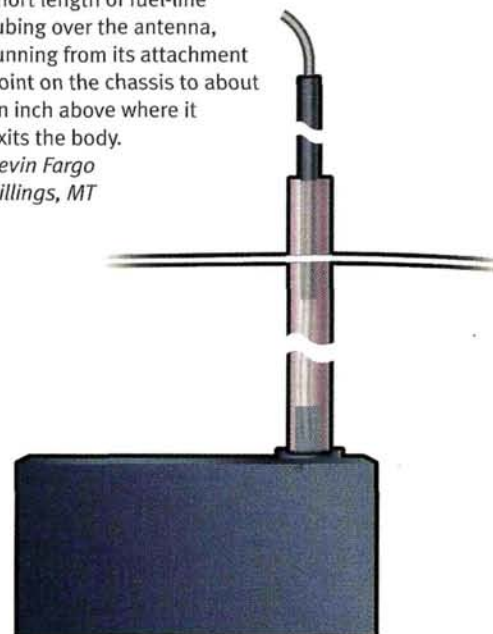
Softer Chevrons

Chevron-pattern tires provide great traction on softer terrain but can be rough handling on harder surfaces. With a hobby knife, make a series of small slits in the treads; this permits the treads to give a little, and you'll have excellent traction, regardless of the terrain.
*Frank Porter
Dover, DE*



Antenna Retainer

Your receiver antenna's shroud may break in half or become detached from the chassis during a rollover. For extra security, slip a short length of fuel-line tubing over the antenna, running from its attachment point on the chassis to about an inch above where it exits the body.
*Kevin Fargo
Billings, MT*



TOP TIP

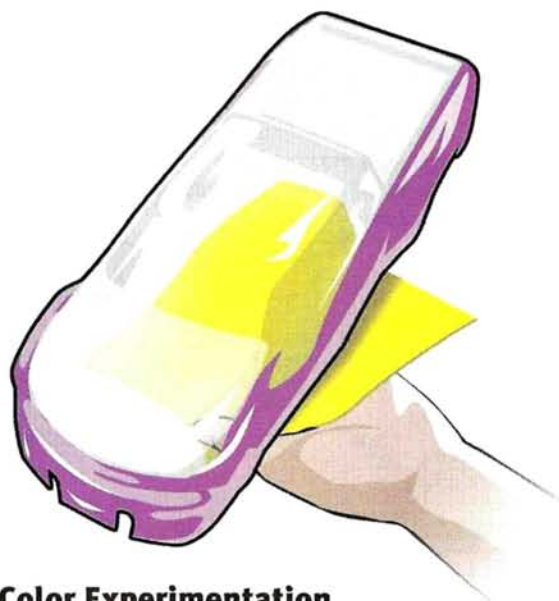
Spatter Nozzle

When painting a body, creating a "spatter," or burst-type pattern is easy, whether you use an airbrush or spray cans. Clamp a clothespin around the spray nozzle at a slight upward angle. The paint will collect on the clothespin, and the compressed air coming from the can or airbrush will blow the paint onto the body and create unique stippled effects.

*Zachary Smith
Edgewood, MD*



Pit Tips



Color Experimentation

Before you commit to a color on your RC body, you can get an idea of how things will look if you hold a piece of colored construction paper on the inside; this will help ensure that your color choice doesn't clash with the rest of your scheme. For only a few dollars, you can buy a multicolored pack of paper that covers the entire spectrum—including fluorescents.

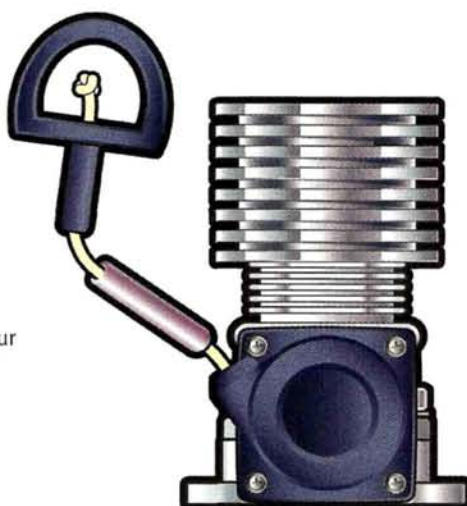
*Bill Lumford
Denville, NJ*



Nut Organizer

Rather than just piling all of your spare nuts into one compartment of your toolbox, save those bent turnbuckles and rod ends and thread the extra nuts onto them. Not only will they be easier to access, but you'll also immediately know that you have a nut of the correct size.

*Bryan Ridge
Portland, ME*



Pull-Start Access

It is sometimes difficult to retrieve your pull-start vehicle's recoil cord because the handle is tucked too far down inside the body. To raise the handle for easier access, carefully untie the recoil cord from the handle, and then slip a short piece of tubing over the cord. Reattach the handle; it will be higher and easier to grab.

*Michael Bowin
Winston-Salem, NC*



Shock-Absorbing Body Posts

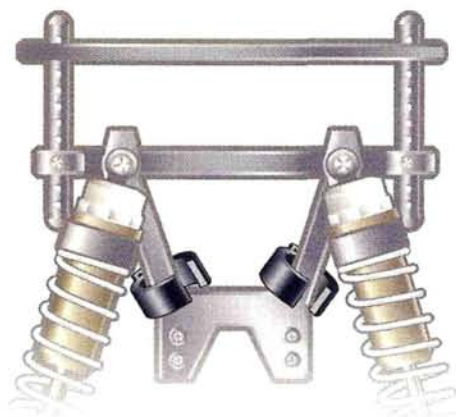
Cracks can develop in the body around the area that rests on the body posts because the body is stressed on the lower supporting pin during a rollover. You can make this area less prone to cracking by replacing the lower pin on the body post with a large shock spring. The spring allows the body to flex in this area more than the pin does and then helps it return to its original shape.

*Robert Heppner
Fullerton, CA*

Preload Keeper

Changing your shock preload usually means a trip back to your pit box if you use the clip-style inserts. Instead, attach a selection of the inserts to your shock tower, and they will be handy when you want to make a change.

*Dustin Ward
Renton, WA*



Troubleshooting

BY GEORGE M. GONZALEZ

Impossible stripped-screw removal

Please help. I have stripped out the heads of two screws that secure the cooling head to the crankcase of my O.S. RZ 99V engine. This is not good because the mounting screws are very deep in the head and I can't reach them with a Dremel tool. Someone recommended that I cut off the tips of the screw heads with a saw and pull the engine head off. That might work, but I would need a very, very thin saw to get it done. Can you guys offer any other solution? [email]

JASON LI

The advice you were given seems sound, but you'll have to cut off the screw heads flush with the surface of the heat-sink-head base. There's no way to avoid tearing up the head in the process, and on some engines, chances are that the head still won't come off after you've sawn through the screw heads because they are slightly countersunk into the base of the heat sink. The best solution is to drill the screws out. To do this, select a drill bit that is just slightly larger than the screw head but not so large that it won't fit through the screw access holes in the heat sink. Using a drill press, pass the drill bit down the access hole until it

Select a drill bit that is just slightly larger than the screw head, but not so large that it won't fit through the screw access holes in the heat-sink head.

contacts the screw head, then gently apply pressure to drill away the head. When the bit reaches the screw shaft, any remaining traces of the head will pop off. After you have removed the heat-sink head, the studs that remain in the block can be slotted and removed with a screwdriver or simply twisted out with pliers.



Work slowly, and lubricate the drill bit as you drill out the stripped screw head.



PHOTOS BY WALTER SIDAS

New Traxxas Aluminum Shock Components Work With Your Stock Parts!

T-Maxx Blue Shock Bodies

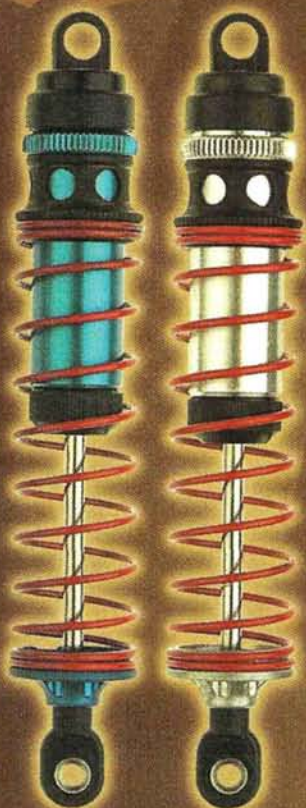


CNC machined, blue anodized aluminum shock bodies, sold in pairs. RRP \$511

Blue Lower Spring Retainers



Machined, blue anodized aluminum retainers, sold in pairs. RRP \$516



Aluminum Upper Spring Retainers



Machined upper spring retainers, sold in sets of 4. RRP \$530 8mm, RRP \$520 4mm

T-Maxx Silver Shock Bodies



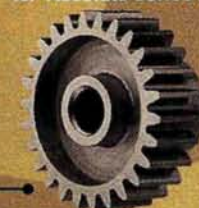
CNC machined, natural silver aluminum shock bodies, sold in pairs. RRP \$510

Silver Lower Spring Retainers



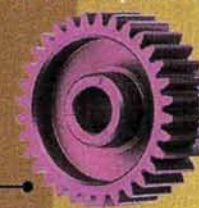
Machined, natural silver aluminum retainers, sold in pairs. RRP \$515

48P Absolute Series Pinions



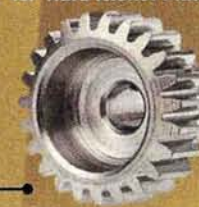
Super hard, lightened and cut with unmatched precision. Great with any spur, but with an Absolute spur, even off noise is gone! Available in 48P in 16T thru 28T sizes, RRP 1415 - RRP 1428

48P / 64P SuperLite Aluminum Pinions



They're lightened, hard coated and precision cut. Available in 48P in 16T thru 28T and 64P in 24T thru 30T. RRP 30XX (48P) and RRP 31XX (64P). Only \$5.25

48P Hard Nickel Plated Steel Pinions



These precision cut gears have an extremely hard coating that makes them really last. Available in 12T thru 35T. RRP 1012 - RRP 1035

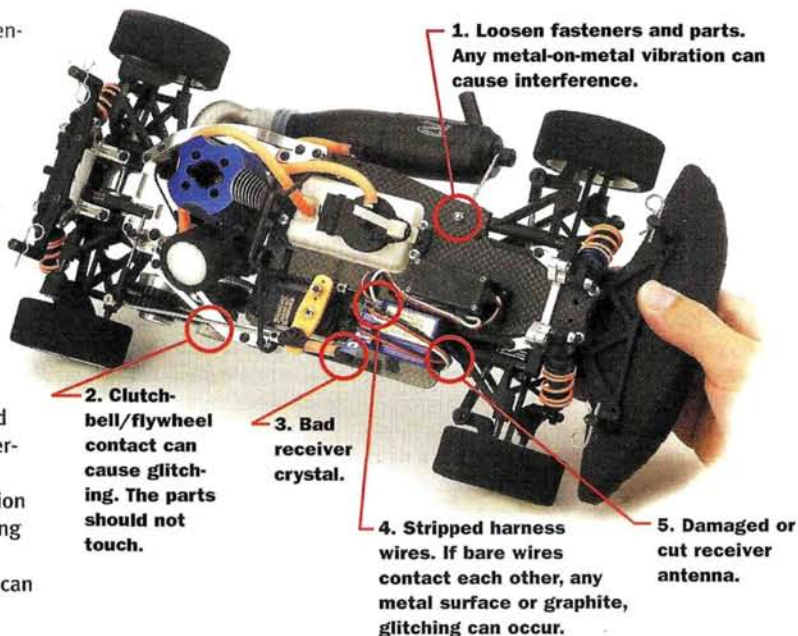
Could it be a glitch?

I have a super-hopped-up nitro touring car. My problem is that whenever I go past $\frac{1}{4}$ throttle, the car goes off to the right then curves back to the left and then veers off the road. Needless to say, this has caused my car to be whacked around on the track. The car has the optional ball bearings for the bellcranks, and there is no binding in the steering system. It is equipped with a Futaba standard S3003 servo. Some fellow racers have told me to buy a servo with more torque. Will that solve my problems? [email] BADD OG

It sounds to me as if you have a glitching problem and not a servo problem, but first try to install a different servo to rule it out before you move on to other fixes. If the servo checks out, inspect the rest of radio system.

Check all of the servo, switch-harness and onboard-battery lead wires for small frays or cuts in the shielding that can cause interference. You can fix minor frays with liquid electrical tape or silicone glue. If the wires and connectors are in good shape, try to reposition the receiver, or mount it on its side with the frequency crystal facing up. If all else fails, try a different set of frequency crystals in the transmitter and receiver. Frequency crystals are very delicate and can be damaged if not used properly.

These areas are common culprits for glitching

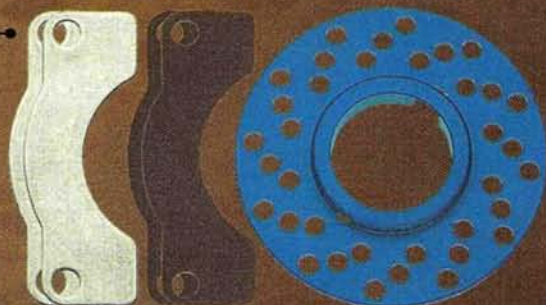


NEW T-Maxx Steel Diff Gear Set



T-Maxx / E-Maxx differential gear set, includes: 1 beveled pinion gear, 1 beveled spur gear, 4 re-usable stainless steel Phillips head screws, 1 tube Associated Black Grease, and a shim kit for spider gears with 10 .003" shims. 2 sets needed per truck. RRP \$590

NEW T-Maxx Aluminum High Performance Brake Kit



New, lightweight aluminum high performance brake kit, includes bigger, more aggressive brake pads and steel backing plates. One piece vented rotor minimizes side-to-side wobble. RRP \$560

T-Maxx Vented Flywheels



Aluminum-vented flywheels move air over clutch bell, improving performance and cooling. RRP \$551 Blue, RRP \$550 Natural Silver

Hardened Steel Spur Gear With Ball Bearing



Precision CNC machined from solid steel, and then hardened, these spurs will last and last. RRP \$572 T-Maxx and Nitro Rustler, RRP \$565 Nitro Stampede

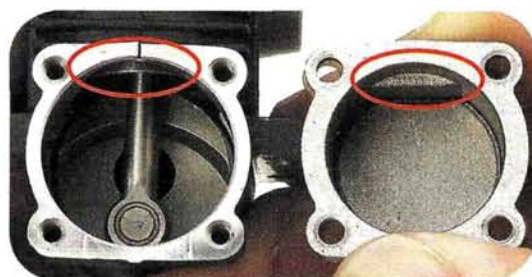
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Troubleshooting



See the step in the backplate? It's there to provide clearance for the piston as it

reaches bottom dead center and dips into the backplate area. If you install the backplate incorrectly, the piston will jam against it. Some engines notch the piston skirt in a similar fashion for crank-lobe clearance.

installed correctly. Remove the clutch bell and inspect the clutch shoes and spring. The clutch spring has eyelets on each end that must be tied together to form a circle. The clutch spring must be fully seated in the groove on the side of each clutch shoe, and the clutch bell should rotate freely without binding. If the clutch shoes or spring show any signs of excessive wear, replace the worn-out components before you run the vehicle.

Your next question: yes, there is a right way to rebuild the engine. You must reinstall the piston and sleeve, connecting rod, cooling head and backplate in exactly the same way as you removed them. You didn't mention the type of engine you're rebuilding, but most engines have an indexing pin on the top of the crankcase and a notch on the sleeve to install the piston and sleeve correctly. Once you have the piston and sleeve in the engine, you can put the connecting rod back on the crankshaft. When you install the backplate, the notch should face up.

One problem leads to another

I have an RC10GT with a clutch that engages instantly; it's almost as though the clutch spring is missing, or something. I tried to set the brake-linkage and idle-adjustment screws so that the truck remains stationary at idle, but I can't get the truck to stop moving. I get the engine idling nicely, but I have to set up the linkage with quite a bit of initial brake to prevent the truck from taking off. Also, my air filter came off when I drove in very loose dirt, so I took the engine apart and cleaned it. I must have put it back together wrong because I broke the connecting rod when I restarted the engine. Is there a right way to install a new piston, sleeve and connecting rod? Also, is the notch on the backplate supposed to face up or down? [email] JEREMY FUNK

It sounds as if something is definitely wrong with your clutch if the engine idles normally and the throttle and brake linkages are



Cylinder sleeves must also be installed in a certain orientation.

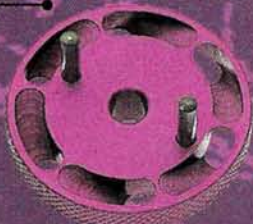
Most engines use a notch in the sleeve to interface with a pin in the case. This engine's sleeve is notched, but there's no pin in the case; it just lines up with the crankcase seam. But should it face toward the front of the engine or the rear? That's why you need to pay careful attention when you disassemble an engine!

RS4 Nitro Aluminum Brake Kit



Lightweight aluminum, variable braking system. RRP 1575

RS4 Nitro Vented Flywheel



Aluminum vented flywheels move air over clutch bell, improving performance and cooling. RRP 1570 RRP 1571 Pull Start

Stealth Sedan Spurs



These precision machined spur gears are super quiet. They're available in 48P in 60T thru 96T sizes, and fit any HPI electric car or truck. RRP 1860 thru RRP 1896.

RS4 Nitro Small Aluminum Drive Pulleys



Hardened drive pulleys, sold in pairs. RRP 1538

RS4 Top Shaft Pulley



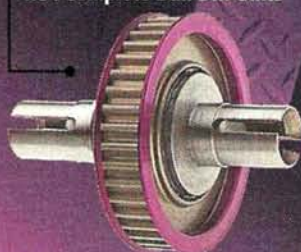
One piece pulley and shaft are precision cut and hard anodized. Purple anodized side flanges are pressed on. RRP 1527

RS4 / Pro / Pro2 / Nitro Aluminum Outdrives



40% lighter than stock ball diff outdrives. RRP 1585

RS4 Complete Ball Diff Units



Hardened steel outdrives, ground and polished thrust washers, 2 5x8mm ball bearings, and aluminum pulley. RRP 1590 Electric RRP 1595 Nitro

RS4 Diff Pulleys



Precision machined, hard anodized aluminum diff pulleys. RRP 1539 nitro sedans RRP 1528 electric sedans

RS4 Nitro Lightened Gear Adapter



This lightened gear adapter includes a machined nylon spur that's tougher than the stock gear and will last longer. RRP 1535

www.robinsonracing.com

RS4 Nitro 32 Pitch Conversion Kit is available. RRP 1536

Time for a rebuild

I have an HPI Nitro Rush with the stock Nitro Star .15FE engine. I have run three gallons of fuel through the engine. The engine has great compression (enough to lift the truck off the ground when I try to start it), but after a minute or so of running, it sputters and dies out. I checked the high-speed needle setting and adjusted the throttle trim correctly,

but the engine still dies after a few minutes of running. I run Wildcat 20-percent nitro with 14-percent oil content.

CHRIS CUMMINGS,
Bradenton, FL

Installing a new piston and sleeve isn't difficult and results in, for all practical purposes, a brand-new engine.



Your engine has all the telltale signs of needing a rebuild, Chris. The seal between the piston and sleeve is designed to be tight when the engine is cold, but as the engine warms up, the sleeve (which is made from a softer metal than the piston) starts to expand, allowing the piston to move up and down inside the sleeve with less friction. Over time, the gap between the piston and sleeve can become too big, and that

can cause a compression problem such as you now have.

Replace the piston and sleeve, and your problems will be solved (see "How to replace a piston and sleeve" in this issue). I also recommend that you replace the connecting rod at this time as well. After you've rebuilt the engine, repeat the original break-in procedure that HPI recommends in the Rush manual. ■

TOOLBOX

DuraTrax Pit Tech car stand

Most wrenching can be done right on the bench top, but for jobs like installing wheels, setting speed controls and tuning engines, a car stand is a must. DuraTrax's Pit Tech model is the best I've tried; it has grippy rubber strips to hold the chassis and a relieved center section that prevents cars like the Team Losi Triple-X and Associated B- and T-series from rocking on the stand. A deep tray prevents small parts from wandering off, and the whole magilla stores compactly when not in use. DuraTrax Pit Tech car stand—part no. 2370; \$12.



RC10-GT Steel Combo



Precision machined from solid steel, then hardened, this 65T spur and 15T bell combo will last and last. The extra-hardened clutch bell fits ALL Associated and MIP shoes. RRP 2365

www.robinsonracing.com

Hardened Steel Idler Gear



Cut from solid steel stock, this gear is lightened and hardened for super quiet precision and extra long life. Jammin' tranny grease is included. RRP 2213 RC10-GT, RRP 7505 Ultima GP-R

Associated Titanium Stealth Top Shaft



CNC Machined from solid titanium, this super hard, super light top shaft will fit any Stealth transmission. RRP 1512.

Hardened Diff Gear



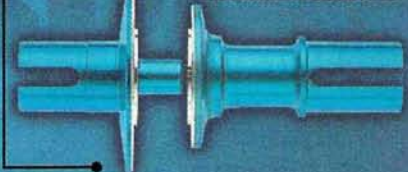
Hard anodized, precision CNC machined aluminum diff gear. RRP 1513 RC10-GT RRP 7500 Ultima GP/EP-R

Blue Lightened Slipper Kit



The rear plate is hard anodized and the front plate is color treated. The front plate holds the pad forcing it to slip on the rear plate. When pad wears, just flip it over for a new surface. RRP 1515 Associated, RRP 7515 Kyosho Ultima

Aluminum Outdrives



40% lighter than stock ball diff outdrives. RRP 1475 TC3, RRP 1502 B3/T3

TC3 Ultra 48 Pitch Spurs



Precision machined from heat-resistant plastic, these spurs mesh flawlessly with our pinions. Available in even numbers from 70T thru 80T, RRP 1670 RRP 1680.

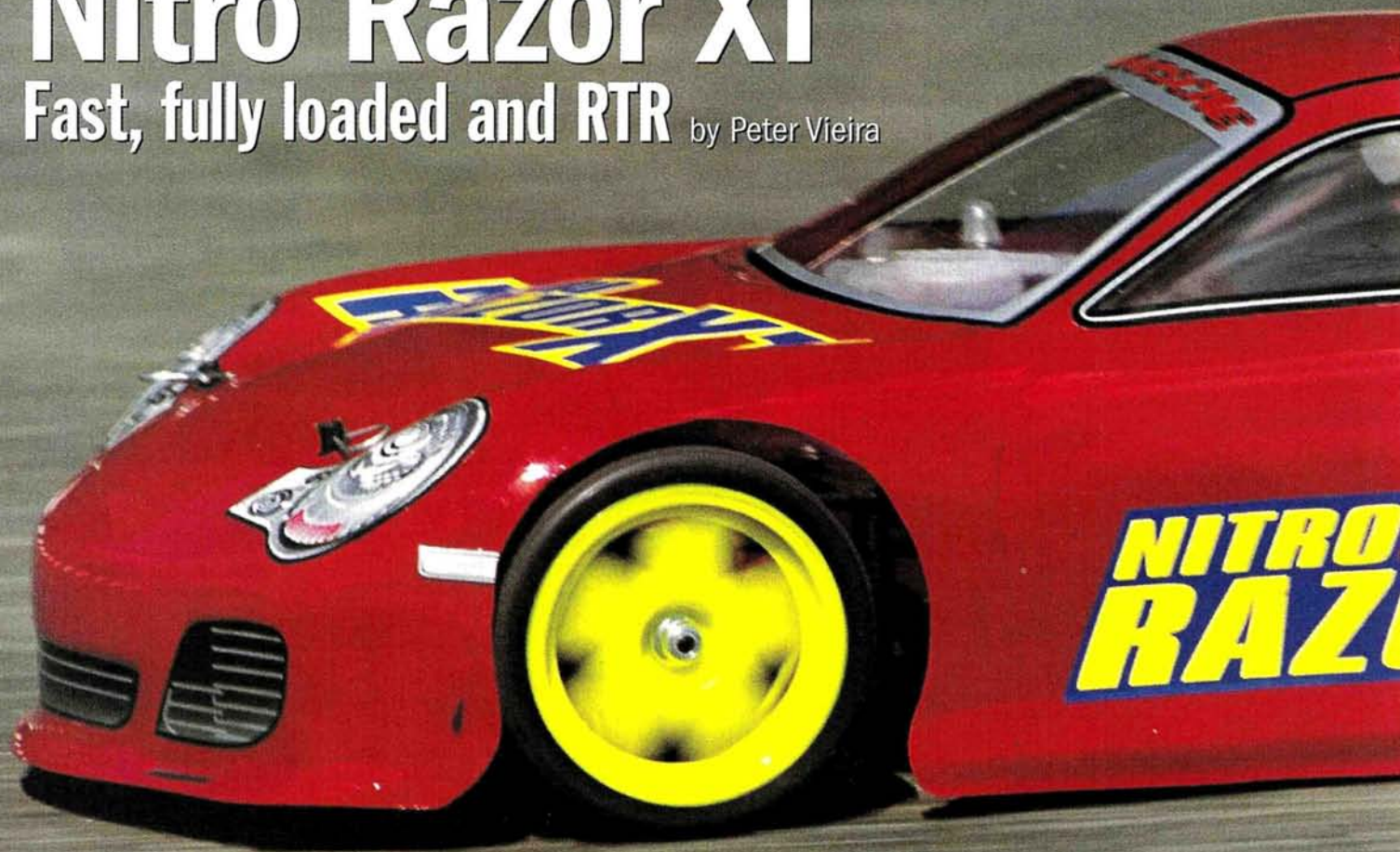


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Megatech Nitro Razor XT

Fast, fully loaded and RTR by Peter Vieira



It used to be a foregone conclusion that the typical buyer of a ready-to-run nitro car knew only enough about RC to know that he wanted his car nitro-powered and factory-assembled, and since any other technical details would be lost on that buyer, all the more reason to make the kit an inexpensive "stripper" model.

Times change. Today's RTR buyer is more savvy than ever and realizes that there's more to nitro-powered cars than an engine and four wheels. Nowadays, the typical RTR buyer wants it all: tuned pipe, aluminum shocks, 2-speed tranny—the works. With that



In mind, Megatech has released a new version of its nitro Razor, dubbed the Razor XT. In addition to a painted, trimmed and decaled body and installed Hitec radio gear, the XT is brimming with high-end features. The shortlist includes a .16 engine, polished aluminum tuned pipe, threaded aluminum shocks, front and rear swaybars, 2-speed transmission and full bearings. With standard equipment like that, it's clear Megatech believes "RTR" doesn't have to mean "entry level." Now let's fire it up and see whether the Razor XT looks as good on asphalt as it does on paper.

DATA CENTER

VEHICLE TYPE Nitro-powered 1/10 touring car, ready-to-run

BEST BUYER Entry-level nitro enthusiast; anyone who's more interested in driving a fast nitro sedan than in building one

KIT RATINGS (poor, satisfactory, good, very good, excellent)

Instructions Satisfactory

Parts fit and finish Good

Durability Very good

Overall performance Very good

SPECIFICATIONS

MANUFACTURER Megatech

MODEL Nitro Razor XT

SCALE 1/10

STREET PRICE \$350

DIMENSIONS

Wheelbase 10.2 in. (260mm)

Width 7.44 in. (189mm)

WEIGHT

Total, as tested 58.4 oz. (1,656g)

CHASSIS

Type Double-deck plate

Material 2mm aluminum

DRIVE TRAIN

Type Enclosed shaft drive

Transmission 2-speed centrifugal, drive-dog type

Drive shafts (F/R) Steel dogbones

Differentials Bevel gear

Bearing type Metal-shielded ball bearings

SUSPENSION

Type (F/R) Lower H-arm with turnbuckle upper link

Shocks Aluminum-threaded body

WHEELS

Type Neo 5-spoke

TIRES

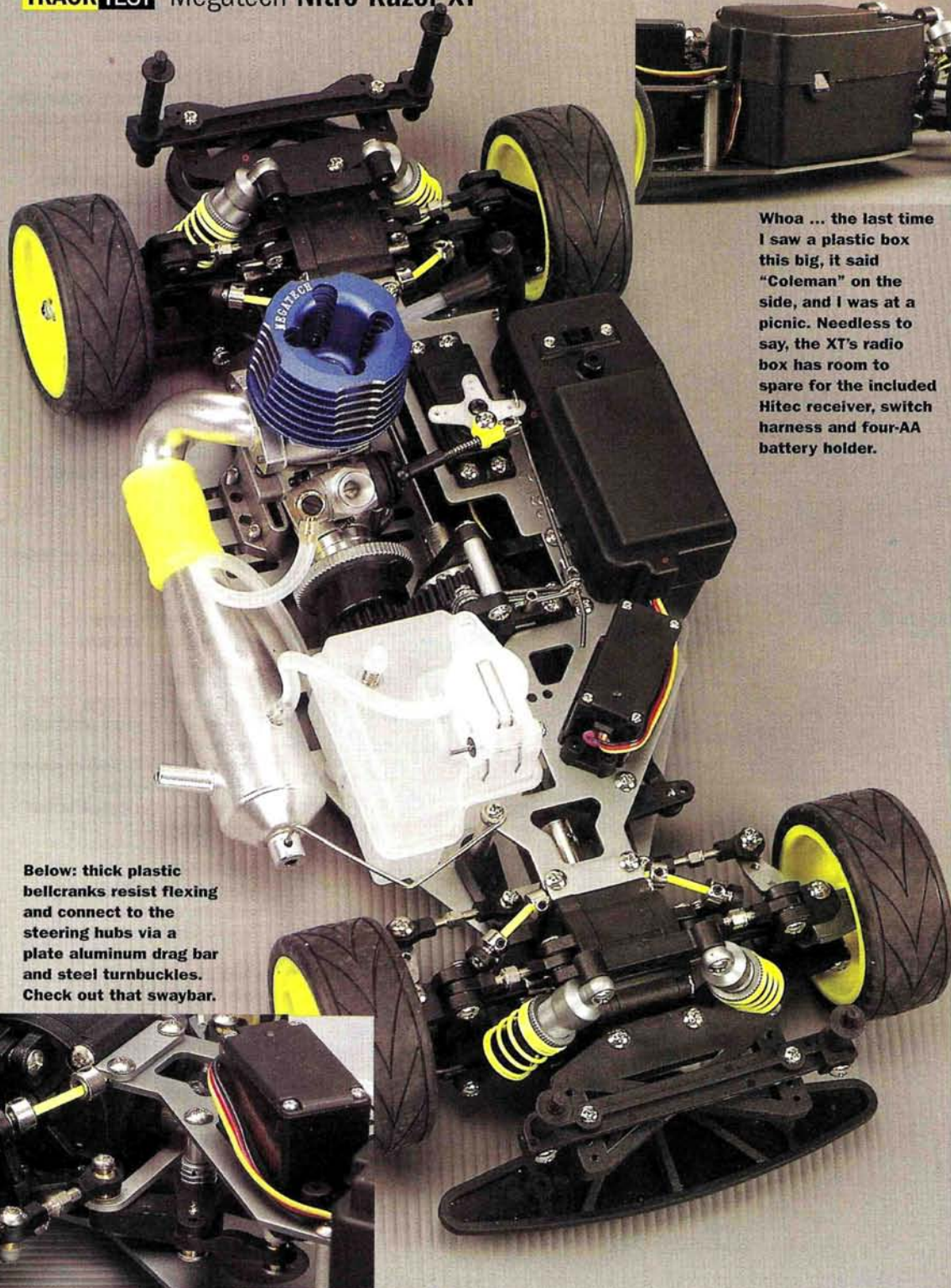
Type Megatech V-tread

LIKES

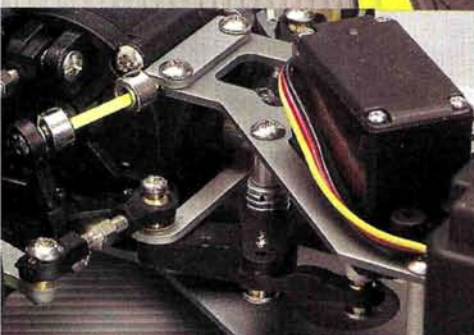
- Powerful, easy-starting M-16 engine.
- Lots of standard features: threaded-aluminum shocks, 2-speed tranny, enclosed shaft drive and more.
- Fast!

DISLIKES

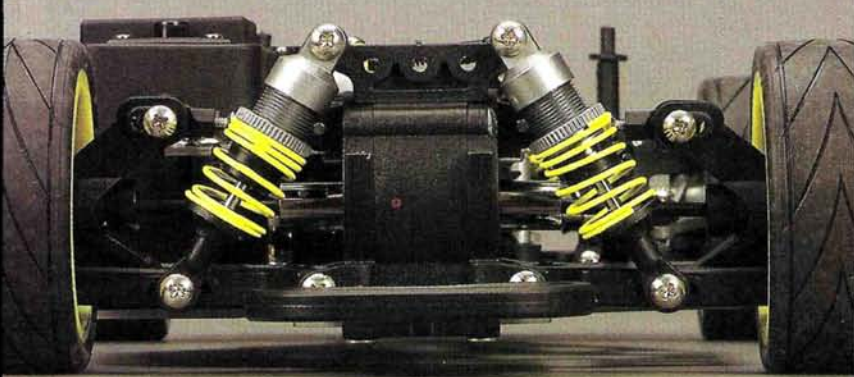
- Body is light on decals, and one-color paint job is tame.



Below: thick plastic bellcranks resist flexing and connect to the steering hubs via a plate aluminum drag bar and steel turnbuckles. Check out that swaybar.



Right: look, Ma; no shock tower! The threaded-body dampers attach directly to the rear gearboxes. Down-travel is easily set with droop screws in the lower arms. The left arm's screw has been threaded in deeply for an "arm level" setting, and the right will be dialed in to match. You can see the droop screw poking out of the top of the arm.



Whoa ... the last time I saw a plastic box this big, it said "Coleman" on the side, and I was at a picnic. Needless to say, the XT's radio box has room to spare for the included Hitec receiver, switch harness and four-AA battery holder.

building & setup tips

Since Megatech has already built the Razor for you, I can't add much about getting it together—but there's always a little something.

Antenna routing. The included Hitec Lynx's HP-2NRB receiver has a very long antenna wire; it's almost twice as long as the antenna tube that holds it. Instead of bundling the wire in the battery box (or cutting it—no!), which would shorten radio range, use rings of fuel tubing to hold the excess antenna wire against the antenna tube.

Body trimming. As mounted by Megatech, the Razor's Porsche 911 body was sitting a little high for my taste. If you like the slammed look, just lower the body posts by removing the screws that pinch them in their holders, sliding the posts down and retightening them. You'll need to enlarge the wheel openings, too; just remove one wheel, place it against the body where the fender well needs to be and then trace around it with a permanent marker. Trim along the line with body scissors or scribe the line with a hobby knife and peel out the waste.

Fuel tank and engine access. For faster fill-ups, thread a zip-tie through the fuel tank's lid (slots are provided for this) and use it as a handle to open the tank without removing the body or getting your fingers in the way of the tank opening. For easier engine access, make a hole in the roof so you can install a glow-starter without removing the body. Remove the entire rear window for pull-start access, and you'll be able to fill and start the Razor XT without ever touching a body clip.

Battery selection. When you pick up the double-A batteries for the Hitec Lynx transmitter and onboard radio gear, pony up for name-brand alkalines. Stay away from "heavy-duty" batteries; they're just optimistically named junk that will quickly go dead. If you decide to upgrade to a rechargeable receiver pack, get a 5-cell model; don't use four rechargeable AA batteries in place of alkalines, or you'll have less voltage than is required for best servo and receiver performance.

KIT FEATURES

• **Chassis.** At first glance, the XT's 2mm-thick-aluminum upper and lower chassis decks seem a bit thin, but thanks to the wide lower plate, the generous acreage of the top deck and the stiffening effects of the spur-gear bulkheads, radio box, front and rear gearboxes and steering bellcranks, the assembled chassis is suitably rigid. The aforementioned radio box dominates the chassis and easily swallows the XT's included 4-cell AA battery holder and Hitec receiver. The included HS-303 servos are hung from the top deck, but the fuel tank is mounted directly on the lower deck.

A short but wide, rigid front bumper stands between the chassis and anything hard, and a rear bumper configured as a carrying handle encourages XT owners to carry the car nose down, so the fuel tank is below the engine. This prevents gravity from allowing fuel to pour from the tank into the carb, potentially flooding the engine and making for a frustrating startup session. Given the widely varying expertise of nitro RTR buyers, the bumper/handle is a nice touch. And it just makes carrying the car easier.



The XT's 2-speed uses Delrin gears for reliability. The large-diameter disc brake is visible just behind first gear, and you can also see the throttle-return spring that's connected to the brake arm.

• **Drive train.** The Razor XT uses a pair of dogbones between the front and rear gearboxes to deliver full-time 4WD. The centrally mounted spur gears are held at the center of the chassis by molded bulkheads, and as the word "gears" would suggest, the XT is equipped with a 2-speed tranny. The dual spur gears are made of Delrin (a tough engineering plastic) for longevity, and the shifting mechanism uses a drive-dog to engage a steel drive pin. The shift point is fully adjustable, and with the included 15/19-tooth clutch bell and 38/42 spur gears, the tranny delivers a first-gear ratio of 2.8:1 and a second-gear ratio of 2:1. Couple this with the front and rear gearboxes' internal 3.36:1 ratio, and you get final drive ratios of 9.4:1 and 6.72:1.

The front and rear gearboxes enclose bevel-gear diffs with steel ring gears that are driven by steel bevel pinions and connected to the drive hubs by steel dogbones, with metal-shielded ball bearings supporting all the parts. The hex hubs are touring-standard 12mm pieces and are friction-fit to tapers on the stub axles. I've found this design to be prone to slipping on other brands of vehicles, but the XT's hexes stayed put; they only popped loose when pried off with a screwdriver.

Stopping power comes from a compact disc-brake system that stacks its steel rotor and padded steel brake pads into a scanty 5mm. With a diameter of 36mm, the rotor is very large as nitro touring-car discs go, and this gives the brake pads plenty of steel to grab onto. The oversize rotor floats on an equally large aluminum hub, which should give the XT's brakes ample wheel-locking squeeze.

• **Suspension and steering.** Aluminum, threaded-body shocks are the star of the Razor XT's suspension system; they feature bottom-loaded seals with snap-on retainers, knurled aluminum preload adjusters and silicone bladders for volume compensation. The springs feel like what most touring-car racers would call "medium" stiffness but are very firm compared with the mattress springs spec'd on most RTR sedans.

The shocks are squeezed by lower H-arms paired with turnbuckle upper links. All four arms are equipped with droop screws, and screw-type hinge pins keep E-clips out of the equation. The Razor's cast-aluminum steering knuckles lend a touch of 1/8-scale buggy to the car. Swaybars are standard equipment and are very thick at 2.5mm. The unusual swaybar design uses very little bend compared with other yoke-type bars, and the result is a very stiff suspension that should have no trouble keeping the XT "flat" in the turns.

The steering system is your basic bellcrank setup, although it's well equipped with steel turnbuckle tie rods, a plate aluminum drag link and a built-in (but nonadjustable) servo-saver. The 'cranks themselves are thick moldings that turn directly on their aluminum standoffs—no bearings or bushings.

• **Engine and accessories.** Megatech didn't mess around with .12-size powerplants for the XT but went straight for its M-16 pull-start mill to motivate the car. The blue-head, .16

12 AA batteries

Fuel

Fuel bottle

Glow starter

Sanyo alkalines

Morgan Sidewinder
20% nitro

Megatech

Megatech Mega-Niter

Hitec Lynx transmitter and receiver

Megatech includes the standard-model Lynx with the Razor XT—a nice step up from the Lynx Sport econo radio. The standard Lynx includes adjustable steering dual rate with a clever Steering Rate Override (SRO) button; even if you dial out almost all of the radio's steering throw, you can instantly get full travel from the steering servo by hitting the SRO. Release the button, and your dual-rate setting returns.

Hitec HS-303 steering and throttle servos

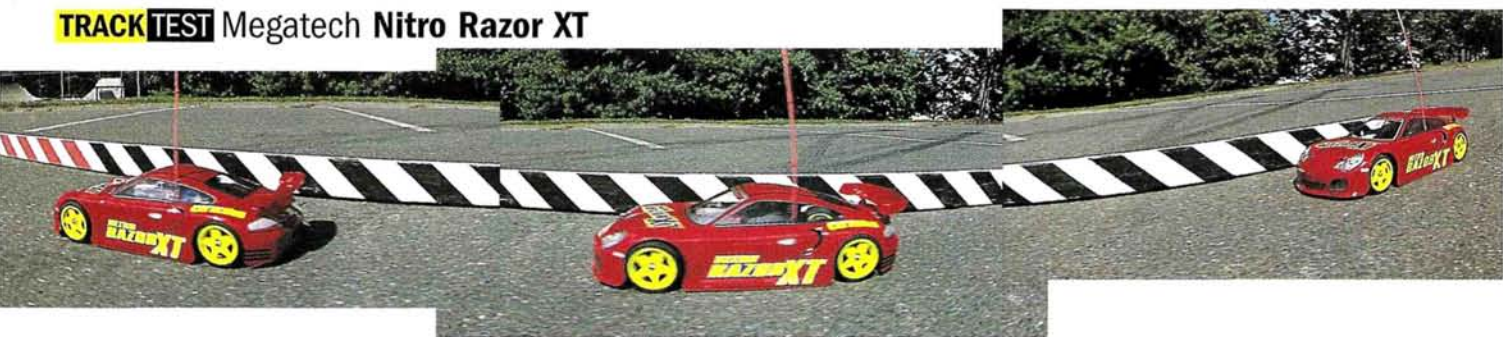
Hitec's basic servo serves well in steering and throttle duty. You could get faster, more powerful servos, but you won't need them for play. The Razor's handling and braking are quite sufficient as is.

Megatech's dual-needle, slide-carb M-16 engine is big on power and looks good, too.



THE COMPETITION

	RADIO GEAR	STARTING SYSTEM	BEARINGS	ENGINE DISPLACEMENT	PAINTED BODY	STREET PRICE	REVIEWED
DuraTrax Street Force	Hitec	Pull-start	Yes	.15	Yes	\$300	9/00
HPI Nitro RS4 RTR	HPI	Pull-start	Yes	.15	No	\$300	4/99
Kyosho Alpha GP RTR	Kyosho Perflex	Pull-start	No	.12	Yes	\$265	11/00
Megatech Razor XT	Hitec	Pull-start	Yes	.16	Yes	\$350	12/01
Mugen Prime 12 RTR	Sanwa	Pull-start	No	.12	No	\$299	1/01
Traxxas Nitro 4-TEC	Traxxas	EZ-start	Yes	.15	Yes	\$319	4/99



engine is a new version of the M-16 that Megatech offers as its Traxxas T-Maxx hop-up engine. According to Megatech, the porting mods don't affect peak horsepower but do give the Razor's engine more high-rpm power to suit the 2-speed-equipped nitro tourer and less of the low-end grunt required for T-Maxx duty. A slide carburetor is standard, the connecting rod is a bushed, machined unit, and the brass piston sleeve is chrome plated—all good stuff. To prevent a runaway Razor, Megatech even sets up the throttle linkage with a return spring.

Neo supplies the Razor's exhaust setup, which includes a bolt-on manifold and silicone-coupled tuned pipe. Both are aluminum, polished to a satin finish and are a definite step up from the typical RTR offerings. The engine and exhaust package should make for plenty of power, and that calls for plenty of fuel. So instead of the usual 75cc tank, the Razor is equipped with a full 100cc juicebox.

• **Body, wheels and tires.** The Razor XT is offered in three body styles: a red Porsche 911, a white Lexus IS200 and a silver Mercedes CLK. All are completely painted, trimmed and decaled from the factory, right down to mounted wings. The factory decals detail the grill, lights, side scoops and window molding, but the large "Nitro Razor XT" graphics shown in the opening spread for this review are not included; I made them myself for the photo shoot.

Megatech turned to Neo for the Razor's neon-yellow, 5-spoke wheels, which are shod with 26mm V-groove tires bolstered by foam inserts. In keeping with Megatech's 100 percent ready-to-run promise for the Razor XT, the tires have been glued for you.

PERFORMANCE

I've had good luck with the M-16 engine series ever since I reviewed Megatech's first nitro tourer way back in the February 1998 issue of *RC Car Action*, and the newest M-16 gave me no reason to change my opinion of the series when it popped to life on the first yank of the pull-starter (after I properly primed the carb and attached a glow-starter, of course). After the usual four or five break-in tanks, I was ready to get on the gas with the Razor XT. The car was a little slow off the line because it was launching in second gear, but the M-16 dug deep and got on the pipe. After pitting to adjust the 2-speed's shift point, I had the Razor launching hard with much snappier acceleration and the distinctive bwaaah-BWAAAH sound of a shifting tranny in action.

OK, so it's fast. But how does it handle? Thanks to its beefy swaybars and stiff suspension, the XT carved turns aggressively, but when I tried to pitch it through turns sideways, the XT scrubbed almost all of its speed. This is unusual for a swaybar-equipped car on unprepared pavement, especially one that is 189mm wide instead of the usual 200mm, and I was surprised at how much traction the XT had. But given the car's 26mm flat-carriage tires and minimal camber settings (as tuned by Megatech), it makes sense that the XT should stick. That traction also makes

the Razor a good stopper, and the distance traveled between the brake application point and the final stopping position seemed impressively short. Of course, brakes are more for slowing than stopping, and the XT's big disc modulated nicely without pulsing.

With good brakes and plenty of traction, the Razor XT liked to be pushed hard into tight turns, set up for the straight with a fingerful of brake and then shot out of the hole in first gear. For big sweepers, all I had to do was hold on and aim the car. I had the most fun when spooling up the Razor XT to full speed on the short road that joins the three separate parking lots where I tested and then carving a tire-smoking 90-degree turn into the last lot. Seeing a 1/10-scale nitro car run at nearly 50mph is cool enough, but watching it corner at that speed is a real thrill. You can see the inside tires trying to lift and the front end fighting for traction. It reminds you how "real" RC is.

After testing, I gave the XT a good run-through to check for wear and tear. The drive train was smooth from the start, but after a bunch of high-speed tankfuls went through the car, it spun even more freely. All the underside screws stayed tight, including the engine mounts, but the button-head screws in the tops of the steering bellcrank standoffs buzzed loose; no biggie. Add the usual scuffs to the chassis bottom and rim sidewall nicks, and you have normal wear for a nitro car.

THE VERDICT

Complete factory assembly, a strong engine and 2-speed performance are enough to make the Megatech Nitro Razor XT a fast and entertaining parking-lot driver. Even if it couldn't turn worth a darn, I would have had fun slinging the XT up and down a parking lot, listening to the tranny shift and hearing the exhaust note wind up and fade out in Doppler effect as it blasts past. The fact that the Nitro Razor XT is a competent handler is really just icing on the cake. Likewise, the bonuses of a polished aluminum exhaust system and aluminum threaded shocks don't really make the car more fun to drive, but they do make it more fun to own—the stuff is just cool. If your local track isn't a stickler for rules about engine displacement and fuel-tank capacity, the Razor XT would also be a fine entry in nitro touring-car racing. The chassis is fully adjustable, and the XT seems durable enough to handle the hard knocks of door-to-door competition. In all, the Razor XT is a well done ready-to-run with much better performance than most would expect from the category. ■

SOURCE GUIDE

HITEC RCD INC.
12115 Paine St., Poway, CA
92064; (858) 748-6948;
www.hitecrcd.com.

MEGATECH
8300 Tonnelle Ave., North
Bergen, NJ 07047; (201) 662-2800;
info@ahcmegatech.com;
www.megatechrc.com.

MORGAN FUELS
a division of Morgan Inc., P.O.
Box 1201, Enterprise, AL 36331;
(800) 633-7556; (205) 347-3525.

NEO
Distributed by Megatech.

Tamiya TA04-R HKS Racing Altezza



The full-scale HKS Altezza's racing history is almost as unique as the car itself. Code-named "Track Attack," with carbon-fiber body panels and wide flared fenders that wrap around low-profile tires, the HKS Altezza is anything but run-of-the-mill. At a cost to build of more than \$300,000, you'd think that HKS intended to campaign it regularly on the Japanese touring car circuit—but it has raced only once. HKS set out to break the circuit record at Tsukuba in Japan, but that destination garnered HKS a mere 2 seconds. Since then, the Altezza has been retired and now serves as an expensive trophy of the ultimate in racing engineering.

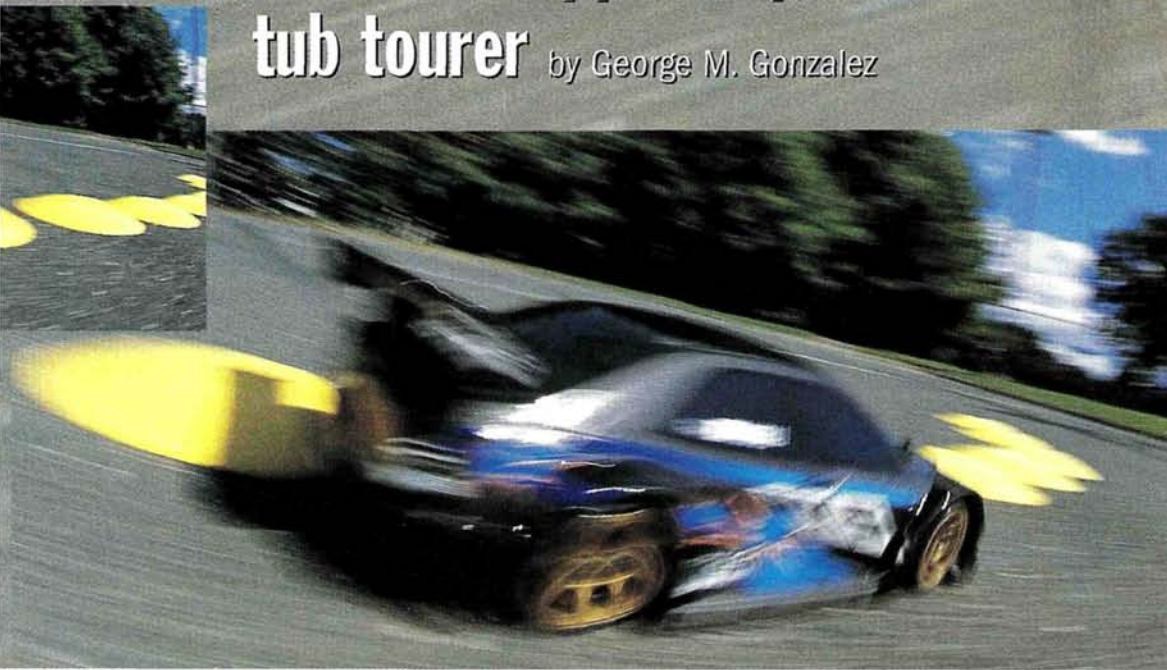
Thanks to Tamiya, the Altezza's racing heritage lives on—in 1/10 scale, anyway. Like the full-scale racer, Tamiya's Racing Altezza is a unique RC car kit. The included body is printed with a carbon-fiber look that perfectly replicates the full-scale car's shell. Here's the best part: the body is wrapped around an equally high-performance Tamiya TA04-R chassis. What's so special about it? Read on to find out.





Carbon-wrapped top-of-the-line tub tourer

by George M. Gonzalez



DATA CENTER

VEHICLE TYPE 1/10-scale electric touring car

BEST BUYER Racers of all levels

KIT RATINGS (poor, satisfactory, good, very good, excellent)

Instructions Excellent

Parts fit/finish Excellent

Durability Very good

Overall performance Very good

SPECIFICATIONS

MANUFACTURER Tamiya

MODEL TA04-R HKS Altezza

SCALE 1/10

LIST PRICE \$389

STREET PRICE \$225

DIMENSIONS

Wheelbase 10.125 in. (257.17mm)

Width 7.36 in. (187mm)

WEIGHT

Total, as tested 57 oz. (1,620g)

CHASSIS

Type Tub

Material Molded carbon fiber

DRIVE TRAIN

Type Dual-belt 4WD

Primary Pinion/spur gear

Internal gear ratio 2.13:1

Drive shafts Universal CV axles

Differentials Ball

Bearing type Shielded

SUSPENSION (F/R)

Type Lower suspension

arm/upper link

Damping Aluminum threaded body shocks

WHEELS

Type One-piece plastic (24mm wide)

TIRES

Type Tamiya Type-B reinforced slicks

LIKES

- Fully optioned chassis.
- Great on-track performance.
- Awesome body.
- Easy to tune.

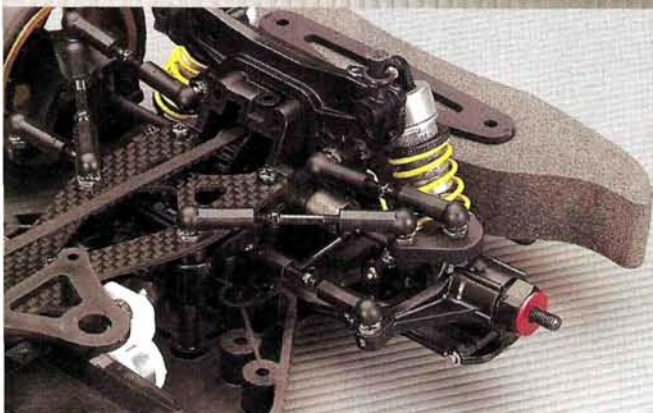
DISLIKES

- The body is just too cool to thrash.

PHOTOS BY WALTER SIDAS AND PETER HALL



Below: the TA04-R's aluminum threaded body shocks are as smooth as they come. The torque rods stiffen up the front suspension for more consistent handling. The Yellow tuned springs, swaybar, turnbuckles and foam front bumper are all standard.



YOU'LL NEED

- Transmitter, receiver, steering servo
- 6-cell battery pack
- Battery charger
- Motor
- ESC
- Tire glue

FACTORY OPTIONS

- Front one-way unit—part no. OP-411
- Center one-way—OP-450
- Hard suspension arms—OP-427
- Aluminum ball-diff pulley—OP-462
- On-road tuning-spring set (firm)—OP-440
- Color stabilizer set—OP-441

building & setup tips

The TA04-R chassis is a little more sophisticated than the standard TA04 or TA04-S chassis; thanks to the excellent instructions, however, the kit is still relatively easy to build. First-time modelers must pay close attention when building the ball diffs and shocks and setting up the swaybars. These few tips may make the building experience even more pleasurable.

Step 1. Check that the diffs are tight and do not slip in any way. After you run the first battery pack, recheck that they are still tight. New ball diffs tend to become loose after diff balls and rings have been broken in.

Steps 5 and 13. When you install the swaybars, pay close attention to the illustrations; swaybars are easily installed upside-down.

Steps 6 and 13. Do not over-tighten the setscrews that thread into the front and rear gearbox covers and retain the swaybars. The swaybars should operate without binding.

Steps 21 and 23. After you build the shocks, measure their lengths; all four shocks should be the same length: Loosening the ball end that threads onto the shock shaft will lengthen the shock.

Step 24. Precisely measure the control rods that attach to the front hub carriers and the upper deck. After you have installed them on the car, rock each torque rod back and forth on the ball joints to ensure that it pivots freely.

Steps 5, 13, 16 and 27. Add a drop of liquid thread-lock to the setscrews that thread into the swaybar ends, the two 3x8mm machine screws that secure the steering posts to the chassis and the two 3x10mm screws that thread into the aluminum servo mounts.

Step 32. I chose to install the antenna-post mount on the upper deck instead of on the rear shock tower. I didn't like the idea of running the antenna lead wire over the battery pack and motor.

KIT FEATURES

• **Chassis.** At a glance, the chassis looks similar to the molded ABS plastic-tub chassis that is standard on the TA04 and TA04-S platforms. The "R" chassis, though, is lighter and more rigid because it's molded of carbon-fiber composite. Because it's stiffer, many of the reinforcing ribs incorporated into the ABS chassis to prevent it from flexing aren't needed, and that leaves more room for mounting electronics. The area under the motor is completely cut out so you can install the motor lower and use larger pinion and spur gears. The battery tray accommodates both stick and side-by-side racing packs. Slots molded into each side of the battery tray allow racers to save a few grams by letting them tape their batteries to the chassis instead of using the plastic battery straps.

A woven-graphite upper deck supported by four posts spans the distance between the front bulkhead and the motor mount. According to Tamiya, the "R" chassis is the most rigid TA04 platform available—even stiffer than the optional double-deck graphite chassis for the TA04-Pro. Racers can alter torsional flex simply by removing one or two of the screws that secure the top deck to the center chassis posts that are molded into the chassis. A transponder mount attached to the top deck confirms the TA04-R's racing intentions.

• **Suspension and steering.** The TA04-R uses the same proven suspension geometry as Tamiya's 414-M team car. All four suspension arms have threaded-in setscrews that can be turned to adjust suspension down-stop, and the front suspension arms are capped at the ends for extra strength and rigidity. The suspension arms pivot on smooth stainless-steel suspension pins that are captured by front and rear suspension-arm mounts.

The front hub carriers and upper deck have extra ball studs that accommodate the included torque

rods. These rods prevent the hub carriers from flexing during hard cornering and ensure that the tires contact the track surface consistently. The rear hub carriers are molded from carbon-fiber composite and have 2 degrees of fixed toe-in. Adjustable tie rods allow camber and front toe adjustment, and a complete set of smooth, light aluminum ball studs are used (instead of the brass units common to many of Tamiya's other RC kits).

Front and rear swaybars and a complete set of aluminum threaded body shocks, are also part of the "R" package. The shocks feature Teflon pistons and shock guides, and their interior, anodized, ultra-shiny surfaces provide the smoothest performance possible. The shocks have silicone O-ring seals and small foam pads in their caps to prevent the rubber diaphragms from deforming during suspension compression. The molded shock towers are very stout, and each has three upper shock-mounting locations for extra tuning versatility.

A ball-bearing-supported dual-bellcrank system steers the TA04-R. The bellcranks pivot on aluminum posts and, thanks to the bearings, provide smooth performance. A heavy-duty servo-saver with three internal tension bands protects the steering servo while it provides more than enough torque to turn the wheels.

• **Drive train.** Like the chassis and suspension, the race-proven TA04 dual-belt 4WD system has been upgraded with many noteworthy hop-ups to bring it up to full "R" spec. Twenty-seven ball bearings used throughout ensure a smooth performance. There are bearings for the wheels, the adjustable belt tensioner, the two belt guides and the front and rear adjustable ball diffs. The TA04-R's ball diffs can be adjusted externally and are easy to reach by removing four screws and popping off one control link.

The TA04-R includes the optional motor mount—thicker than the stock TA04 piece and



Hitec Lynx 3D FM radio system

I used Hitec's Lynx 3D FM radio system with the included Spectra module that has all of the 75MHz TX frequencies at your disposal—no more transmitter crystals. The Lynx 3D performed flawlessly during the track test.

Novak XXXTRA receiver

If you use Novak's new XXXTRA synthesized 75MHz FM receiver in conjunction with the Hitec Spectra module, as I did, you won't need receiver crystals, either. The XXXTRA receiver, in a word, is "awesome." It's light, provides excellent reception and has all of the crystals synthesized into memory.

Airtronics 94157 servo

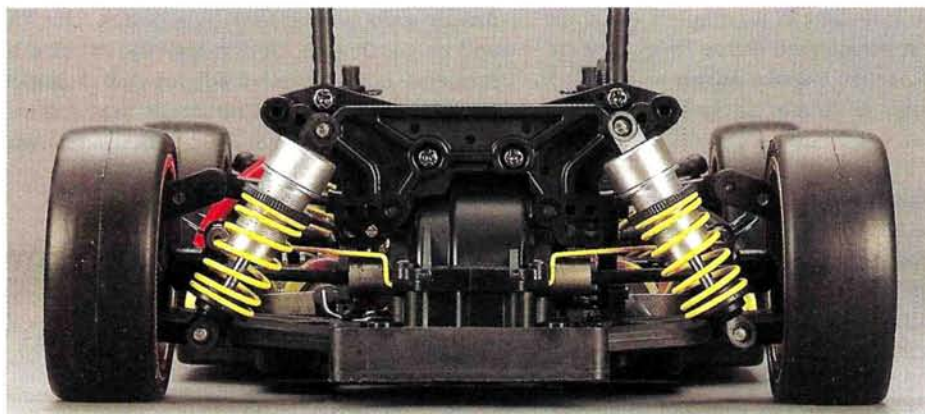
The Airtronics 94157 servo used during testing may not be the latest servo to roll off of the Airtronics assembly line, but it's certainly one of the greatest. With 90 oz.-in. of torque and a transit speed of 0.09 second, it is more than capable of swinging the TA04-R's tires around.

Novak TC2 ESC

The TA04-R is a race car, so I wanted race-car performance from its ESC. The Novak TC2 fit the bill perfectly, and I exploited its user-selectable profiles during the tests. It gave smooth, trouble-free performance and never got hot.

Reedy 2400 Zappers and Ti motor

I powered the HKS Altezza with Reedy 2400mAh Zappers and an 11-turn Ti motor. This battery and motor combination provided so much power that several racers approached me to ask which type of motor I was using.



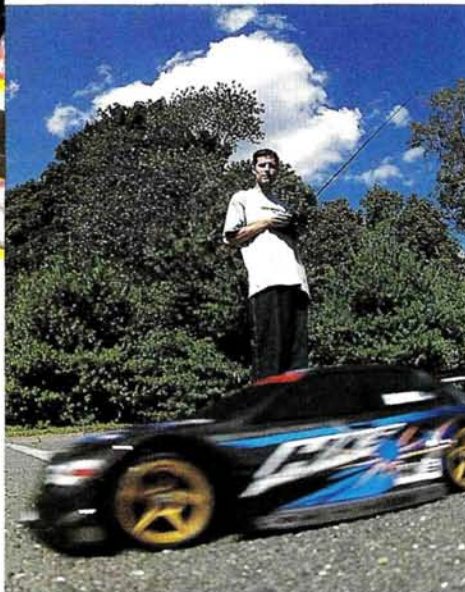
Right: the shock towers are thickly webbed for strength, and offer plenty of camber link position options. Aluminum ball joints are used throughout to reduce weight.

THE COMPETITION

	CHASSIS	DIFFS	SHOCKS	BEARING TYPE	DRIVE TRAIN	STREET PRICE	REVIEWED
HPI RS4 Pro 3	Plastic	Ball	Plastic	Rubber-sealed	Dual-belt	\$199	07/01
Team Losi Triple-S	Plastic	Ball	Aluminum	Metal/teflon-sealed	Single-belt	\$229	10/01
Tamiya TA04-R	Graphite	Ball	Aluminum	Metal shielded	Dual-belt	\$225	12/01
Team Associated TC3	Plastic	Ball	Aluminum	Teflon-sealed	Shaft	\$225	2/00
Schumacher Axis 2	S1	Ball	Aluminum	Metal-shielded	Dual-belt	\$219	12/00



For additional cooling, the TA04-R's finned aluminum motor mount is twice as thick as the one found on other TA04 models. The aluminum and graphite spur-gear mount accepts standard spur gears, and the kit includes four spur gears for tuning versatility.



finned to help dissipate heat more efficiently. Also included is the optional graphite/aluminum spur-gear mount (accepts standard spur gears) and the optional rear bulkhead beam (attached between the rear bulkhead halves). Three .04-module (64-pitch) spur gears are provided: 112, 120 and 128 teeth. The kit also includes a 45-tooth pinion gear that—depending on the spur gear used—allows you to gear the car for both stock and modified racing. Final drive is transferred to the wheels via smooth CV (constant velocity) axles.

• **Body, wheels and tires.** Tamiya tops off the chassis with an equally trick Altezza body that comes trimmed and painted in a unique carbon-fiber finish that looks like the real thing. In my opinion, it is the coolest body ever to sit on top of a touring car! It has a separate Lexan wing and adjustable molded wing mounts that also look like those on the full-size car. A complete decal set allows you to re-create the full-scale Altezza's racing livery. The kit also includes a complete set of 24mm, 5-spoke Advan wheels and Tamiya's new Type-B compound, reinforced slicks with molded inserts.

PERFORMANCE

I raced the TA04-R at the Hitec RCD/Hobby People Third Annual Parking Lot Challenge held at the Hitec facility in Poway, CA. I ran it box-stock, but I decided to spare the body from the carnage and installed a Tamiya Corvette C5 body in its place. I was entered in the Stock Sedan class, so I bolted in a Reedy MVP 24-degree competition stock motor and installed the smallest spur gear (112 teeth) that came with the kit. I also used the supplied huge 45T pinion gear. With that combination, the car was geared a little on the high side, but I knew I'd be able to gear it down if necessary. I ran Pro-Line LP slicks with HPI firm inserts in the morning when the track was cooler, and I switched to the stock Tamiya Type-B slicks and inserts in the afternoon when the track was at its hottest.

I first noticed the TA04-R's smooth, efficient drive train. The car

was virtually silent as it flew down the straightaway at full speed. It had good top speed, but after a 5-minute run, the blazing-hot motor confirmed that it was indeed over-geared. For the next run, I installed the 120-tooth spur gear. Ironically, the car seemed just as fast down the straightaway, but it had more bottom-end grunt, and that got it out of the corners a little faster. At the end of the run, the motor was still hot, but not overly so, so the gearing was in the ballpark.

I was very impressed with the steering. The car had abundant low-speed steering that allowed me to twist in and out of the corners and chicanes effortlessly. It also held a tight line going through the high-speed sweeper and still had the necessary turn-in capability to dive into the hairpin turn at the end of the sweeper. Even with the abundant steering, handling felt neutral because the rear end stayed in place no matter how hard I pushed the car.

I wanted to try a modified motor, so I headed to Tamiya America's West Coast facility's permanent on-road track (where the annual TCS Nationals are held). The TA04-R was just as stable with the Reedy 11-turn Ti motor, but it now had a slight on-power push. Actually, the switchback turns at the end of the straightaway were the only turns that gave me any trouble; the TA04-R kept a tight line around every other turn. I thought about removing the front swaybar but decided instead to install stiffer springs all the way around. I chose Tamiya's firm Blue springs for the rear shocks and super-stiff White springs on the front. To say that the TA04-R now felt dialed would be an understatement; I was able to keep the throttle buried

through the sweeper and to carry most of the speed through the tighter turns.

THE VERDICT

The Tamiya HKS Racing Altezza gives you the best of both worlds. It comes with one of the best-looking and most true-to-scale bodies I've ever seen on a touring car. And the body, printed with the unique carbon-fiber look, is a bonus. The TA04-R isn't all show and no go, though. Underneath the detailed body lies a high-performance chassis that's ready for club racing on Saturday night or for the ROAR On-Road Nationals next summer. The Tamiya HKS Racing Altezza with the TA04-R chassis is a winner in my book. ■

SOURCE GUIDE

AIRTRONICS
1185 Stanford Ct., Anaheim, CA
92805; (714) 978-1895;
www.airtronics.net.

HITEC RCD INC.
12115 Paine St., Poway, CA
92064; (858) 748-6948;
www.hitecrod.com.

NOVAK ELECTRONICS INC.
18910 Teller Ave., Irvine, CA
92612; (949) 833-8873;
www.teamnovak.com.

PRO-LINE
P.O. Box 456, Beaumont, CA
92223; (909) 849-9781;
www.pro-lineracing.com.

REEDY
a division of Team Associated,
3585 Cadillac Ave., Costa Mesa,
CA 92626; (714) 850-9342;
www.teamassociated.com.

TAMIYA AMERICA INC.
2 Orion, Aliso Viejo, CA 92656-
4200; (800) TAMIYA-A;
www.tamiyausa.com.

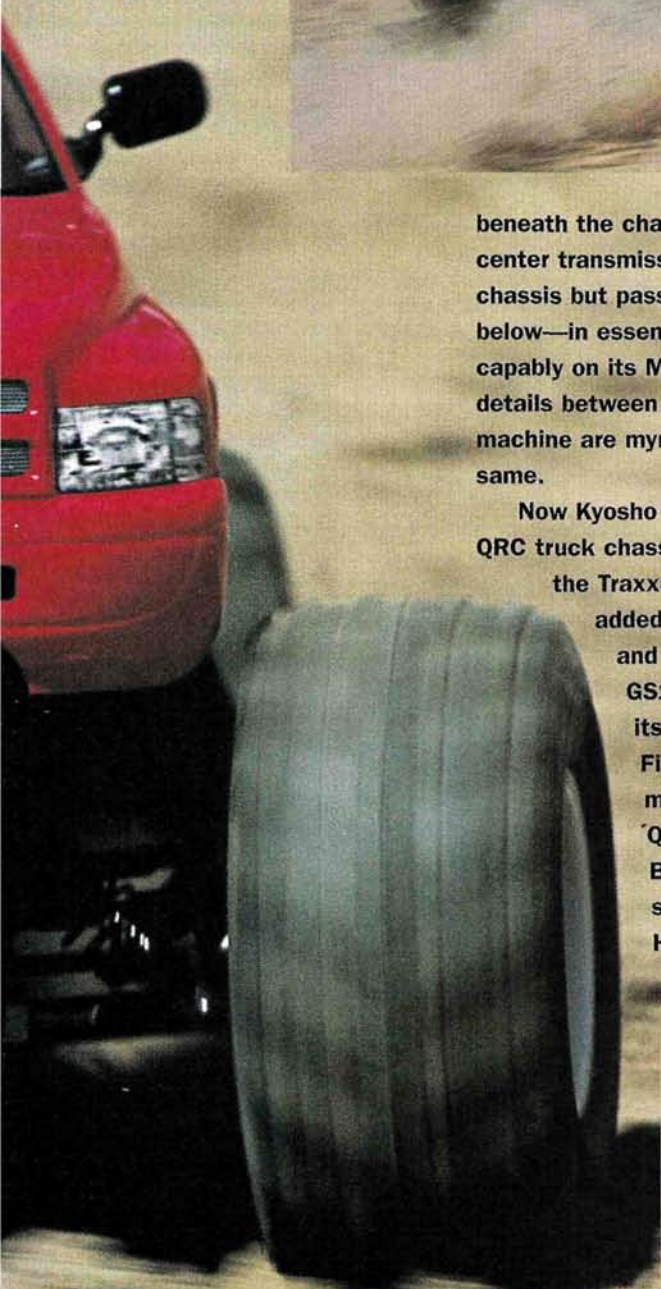
Kyosho Wild Dodge Ram and Baja Beetle QRC trucks

**Revisiting
the original
reversing
nitro machine**

by Peter Vieira

Sometimes you don't realize history has been made until it repeats itself. Case in point: the Kyosho QRC Field Beetle, released in 1997. When the Beetle was introduced nearly five years ago, everyone recognized the significance of its Quick Reverse Clutch (QRC) transmission that permitted it to back up under nitro power. That was history. But it wasn't until Traxxas released the T-Maxx that the Field Beetle's other drive-train features could be fully appreciated. Its front and rear gearboxes were suspended





beneath the chassis and joined via shafts to a reversing center transmission that was bolted to the top of the chassis but passed through it to meet the drive shafts below—in essence, the same layout as Traxxas uses so capably on its Maxx trucks. The differences in technical details between the Maxx trucks and Kyosho's QRC machine are myriad, but the broad strokes are the same.

Now Kyosho has released an updated version of the QRC truck chassis that, ironically, takes a page from the Traxxas design book. A disc brake has been added to the formerly brakeless drive train, and an electric starter replaces the Kyosho GS15R engine's pull-starter. The GS15R itself is another upgrade, as the original Field Beetle included a smaller-displacement GS-11X powerplant. The revised QRC-equipped trucks are offered with Baja Beetle and "Wild" Dodge Ram-style shells, and with Ram-fan Kevin Hetmanski's help, I built and tested both.



DATA CENTER

VEHICLE TYPE 4WD off-road nitro truck with reversing transmission

BEST BUYER Nitro-powered truck enthusiasts who appreciate Ram and Beetle looks with reversing capability

KIT RATINGS (poor, satisfactory, good, very good, excellent)

Instructions Good

Parts fit/finish Very good

Durability Very good

Overall performance Good

SPECIFICATIONS

MANUFACTURER Kyosho

MODELS Wild Dodge Ram and Baja Beetle

DISTRIBUTOR Great Planes

SCALE 1/10

STREET PRICE \$320

DIMENSIONS

Wheelbase 10.4 in. (264.1mm)

Width 11.4 in. (289.6mm)

WEIGHT

Total, as tested 72 oz. (2,041g)

CHASSIS

Type Single-deck plate

Material 2.5mm aluminum

DRIVE TRAIN

Type Open gearbox with reverse and shaft drive

Primary Clutch bell/spur gear

Drive shafts Steel dogbones

Differentials Bevel gear

Bearing type Metal bushings

SUSPENSION

Type Lower H-arm with one-piece camber link

Shocks Plastic-body with indexed preload, oil-filled

WHEELS

Type 2.2-in., one-piece plastic

TIRES

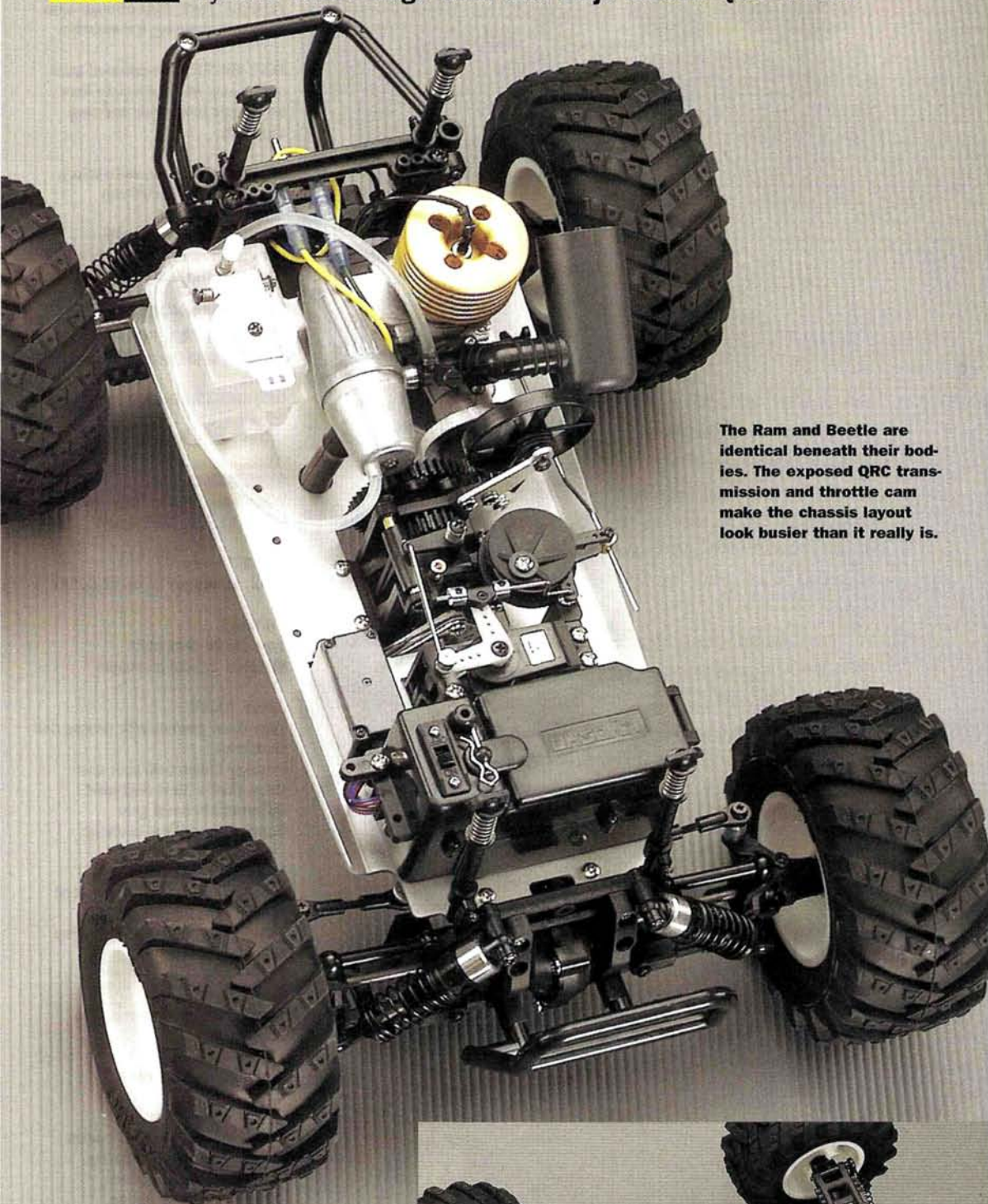
Type Chevron/lug tread

LIKES

- Good-looking, detailed bodies.
- Convenient electric starting.
- Solid 25mph top speed.
- Reverse or brake option.

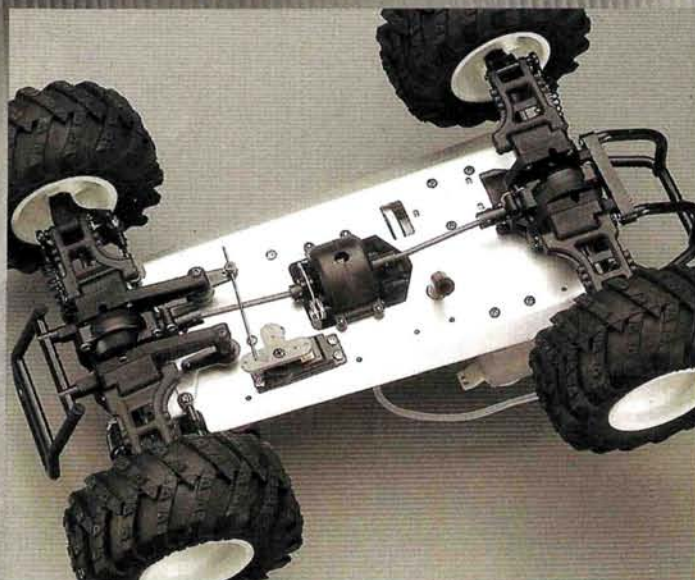
DISLIKES

- Starting the engine requires a stick pack and charger.
- Transmission shifts noisily.
- No brakes when vehicle is set up for reverse.



The Ram and Beetle are identical beneath their bodies. The exposed QRC transmission and throttle cam make the chassis layout look busier than it really is.

Right: from below, the QRC chassis' suspended front and rear gearboxes and drive axles are visible. You can also see the lower half of the QRC transmission and its factory-installed disc brake.



YOU'LL NEED ■ Transmitter and receiver ■ Steering and throttle servos ■ Tire glue ■ Fuel ■ Fuel bottle ■ Stick pack ■ Charger ■ Polycarbonate-compatible paint

FACTORY OPTIONS

- Universal drive shafts—part no. W5061
- Engine mount for non-Kyosho engines—FD20
- Steel differential ring gear—FZW13
- Steel differential pinion gear—FZW15

building & setup tips

The QRC chassis is easy to assemble, and Kyosho's instructions are well illustrated. I do wish the parts were packaged more logically so that each step corresponded at least roughly with the contents of just one or two bags, but this is a minor annoyance. Use the following tips to get the most from your QRC truck.

Mark the manual. Addendum sheets indicate the additional steps for touch-starter assembly and brake installation that the original manual omits; mark the steps in the main manual where a look at the addenda is required so you won't miss anything later.

The usual stuff. Thread-lock the engine mount screws and throttle-linkage setscrews, glue the tires with high-quality CA, and use 4 AA alkaline cells or a 5-cell rechargeable receiver pack for best performance.

Zip-tie the air filter. On one occasion, the Beetle lost its air filter, and the dust in the air quickly coated the carb's rotary valve and jammed it. Unless you feel like running the truck wide open from start to finish every time (bad idea), I suggest you put a zip-tie around the base of the air filter to prevent it from bouncing off.

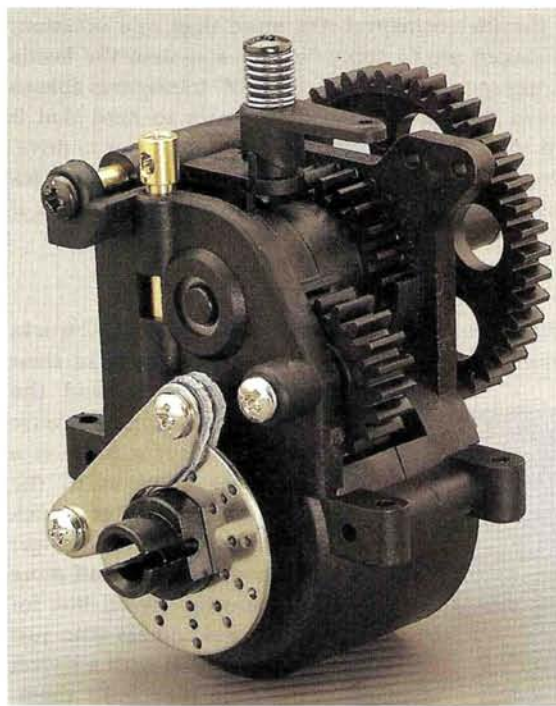
Step 23. Skip ahead to steps 29 and 30, and install the radio box before you install the steering system. If you wait, the steering drag bar will block one of the screw holes.

Step 32. The instructions tell you to install the lower half of the throttle cam assembly on the chassis before you install the spring and the cam itself. It's easier to assemble the cam parts first and then to install the completed assembly on the chassis. Before you build, lightly grease the throttle cam pivot pin as well as the top and bottom surfaces of the cam itself. I found the cam tended to hang up otherwise.

KIT FEATURES

- **Chassis.** Standard nitro stuff here, with a 2.5mm aluminum plate serving as the truck's backbone. The sides of the chassis are radiused for strength, and a prominent cutout in the center is home to the QRC tranny. Additional openings provide clearance for the engine's flywheel and pull-starter and the inverted steering servo. A large, sealed radio box keeps the receiver and its battery safe from fuel and dirt and should look familiar to owners of Kyosho's MP-5 and MP-6 buggies (since that's where Kyosho borrowed the box from).

- **Drive train.** Kyosho's factory-assembled QRC transmission is the star of the show and is deceptively simple. It's basically two transmissions in one, with an independent set of gears for forward



The Ram and Beetle kits include factory-assembled QRC trannies with installed disc brakes, but if you decide to use the brake, you won't be able to use reverse (and vice versa).

and another for reverse operation. Both gear trains spin in the same direction, as their top gears are on a common shaft that is spun by the spur gear, but the reverse gear set includes a countergear that reverses the rotation of the bottom gear. To select between forward and reverse, a servo-actuated fork slides a clutch disc against the forward or reverse gear and engages the gear via a steel pin.

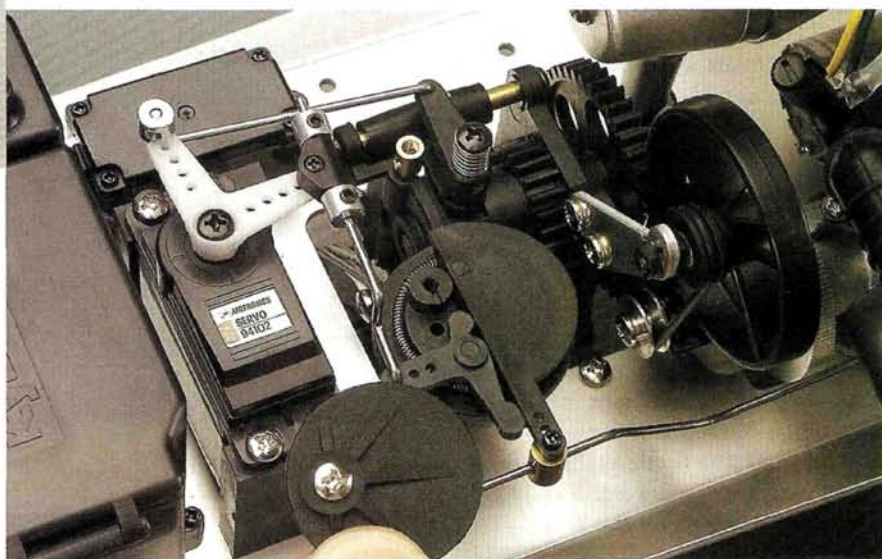
Understanding how the tranny shifts is simple enough, especially when you see it in action, but Kyosho had to get creative with the throttle system to be able to provide forward and reverse throttle control without a third channel. To achieve this, the QRC trucks use a cam linkage that opens the throttle and returns it to neutral no matter in which direction the servo pushes the cam; the photos make it easy to understand.

One item the QRC chassis lacked was a brake system, but the latest trucks include a transmission-mounted disc brake with steel rotor and padded calipers. Unfortunately, when you build your truck, you'll have to decide between having a brake and having reverse capability, because you can't have both—at least, not simultaneously. You can convert the truck from reverse-capable to brake-only (and vice versa) with a few minutes of wrenching anytime you like.

Front and rear bevel-gear differentials give the Ram and Beetle full-time 4WD, and the diffs are spun by steel ring gears and bevel pinions that connect to the QRC gearbox via steel dogbones. Likewise, steel dogbones join the diffs to the drive hubs, which are press-fit to tapered axles. As with so many of the trucks' other parts, the Ram and Beetle's gear cases are shared with other Kyosho vehicles, most notably the SuperTen and Inferno TR-15.

- **Suspension and steering.** Kyosho dipped into its existing parts inventory for the QRC trucks' suspension pieces, and outfitted them with lower A-arms and hub carriers from the TF-series touring cars. The arms are short, but thanks to deeply offset wheels, the Ram and Beetle have a wide off-road stance. Plastic-body, oil-filled shocks take care of jolt management and use clever, rotating collars to incrementally adjust preload without clip-on spacers. Molded-plastic shock towers and fixed-plastic camber links round out the suspension details.

A pair of bellcranks with a plate-aluminum drag bar and integrated servo-saver are suspended beneath the chassis and are joined to the steering



After removing a cover, we can see Kyosho's clever cam-throttle actuator. Whether the throttle servo swings forward to shift the QRC tranny into forward, or backward to shift it into reverse, the cam always opens the carburetor.

arms by threaded tie rods. Aluminum standoffs on the arms raise the tie rods to minimize bump steer, and toe-in adjustments are possible.

- **Engine and accessories.** The original QRC Field Baja Beetle was equipped with a GS11X pull-start engine, but the new Wild Dodge Ram and Baja

Airtronics Blazer radio system

In my opinion, the blue Blazer is the best-looking transmitter in RC, but there's more to this radio than its cobalt case. The Blazer includes nice-for-nitro independent endpoint adjustments on the throttle and the steering channel as well as an adjustable steering rate. It's also affordable and reliable—a combo everyone can appreciate.

Airtronics 94102 steering and throttle servos

These are included with the Blazer system and are just fine for hacking around with the QRC trucks. Airtronics' standard servos are some of the most durable I've used.

DuraTrax Red Alert 20-percent-nitro fuel

I grabbed a quart bottle of DuraTrax's cherry-looking fuel; those gallon jugs get heavy! According to DuraTrax, "Red Alert fuel contains an advanced lubricant package that provides engine protection equivalent to that of fuels with 18% conventional lubricant content." I ran the QRC trucks very hard with no engine troubles, so I guess the mystery lube works.

TRACK TEST Kyosho Wild Dodge Ram and Baja Beetle QRC trucks

Beetle use much more robust GS15R engines. The carburetor is a molded-plastic rotary unit with fixed low-end needle, and to increase engine cooling, a belt-driven fan is spun by the crankshaft to direct airflow over the GS15R's short heat-sink head. An onboard electric touch-starter is new to the QRC mix; a 7.2V stick pack is required to start the engine, which is achieved by taping a starter probe to the battery and inserting the probe into a receptacle in the



Kyosho's touch-starter straps onto a stick pack with tape and is pressed into a socket in the rear of the chassis to fire the engine.

chassis' rear. As soon as the pack is plugged into the receptacle, the electric starter begins cranking the engine.

A canister muffler keeps the engine quiet, and a 75cc tank holds the fuel. Kyosho also supplies its unusual but satisfactory "corncob pipe" air filter.

• Body, wheels and tires.

The Ram and Beetle are equipped with one-piece, 2.2-inch wheels and chevron-tread tires that have served well on numerous other Kyosho vehicles, and clear bodies with ample decals are provided. But don't look for any body clips; instead, spring-loaded, flip-down tabs secure the Ram truck and VW-inspired Baja Beetle shells. Both vehicles also include chrome detail pieces, including a grill and light bar for the Ram and headlights and taillights for the Beetle.

PERFORMANCE

Based on my experience with Kyosho engines, I expected the Ram and Beetle to start easily and run reliably, which they did (especially with electric starting), but I did not expect them to be particularly fast or exciting to drive. They surprised me! While neither will challenge a 2WD nitro racing truck, their top speeds of 25mph were plenty fast enough to keep driving fun, and the short-arm suspensions were more supple than I expected. Full-

time 4WD gave the Ram and Beetle excellent climbing abilities, and although they could use more damping, the trucks jumped well. Hard landings caused the steering tie rods to pop off, as they do not have as much travel as the suspension arms do, but otherwise the trucks held together well.

I'd describe the QRC trucks' steering as OK; granted, I could have installed stronger steering servos, but the plastic servo-saver spring was the real culprit. Luckily, the fix is easy and cheap (see "Building and setup tips") and improves steering precision noticeably.

I had the most fun driving the Wild Dodge Ram, which Kevin had built with a brake instead of reverse. The ability to back up the Beetle was novel, but the transmission makes uncool-sounding snapping and popping noises, as the clutch disc's drive pin bounces off the forward or reverse gears before engaging. And it's hard to avoid accidentally jamming the truck into reverse when returning the throttle to neutral. On more than one occasion, force of habit caused me to apply "brake" and slam the Beetle into reverse at top speed. Incredibly, the QRC tranny was able to handle this, even though it stopped the truck so hard that it flipped onto its roof. Kevin's Dodge was just a lot easier to drive, and I felt having a brake was worth the trouble of a walk to kick the truck off an obstacle instead of being able to noisily back it out of trouble.

THE VERDICT

Kyosho's engine upgrade and touch-starter make the QRC trucks livelier and more convenient to run than they were in their

original release, and the option of swapping reverse capability for a brake is a welcome addition to the formula. Monster truck purists will wish for longer suspension arms and more suspension travel, but for nitro newcomers who just want to bash with a stylish machine they built themselves, the Wild Dodge Ram and Baja Beetle QRC trucks offer a pleasant build and good performance in stylish, high-riding package. ■



SOURCE GUIDE

AIRTRONICS

1185 Stanford Ct., Anaheim, CA 92805; (714) 978-1895;
www.airtronics.net.

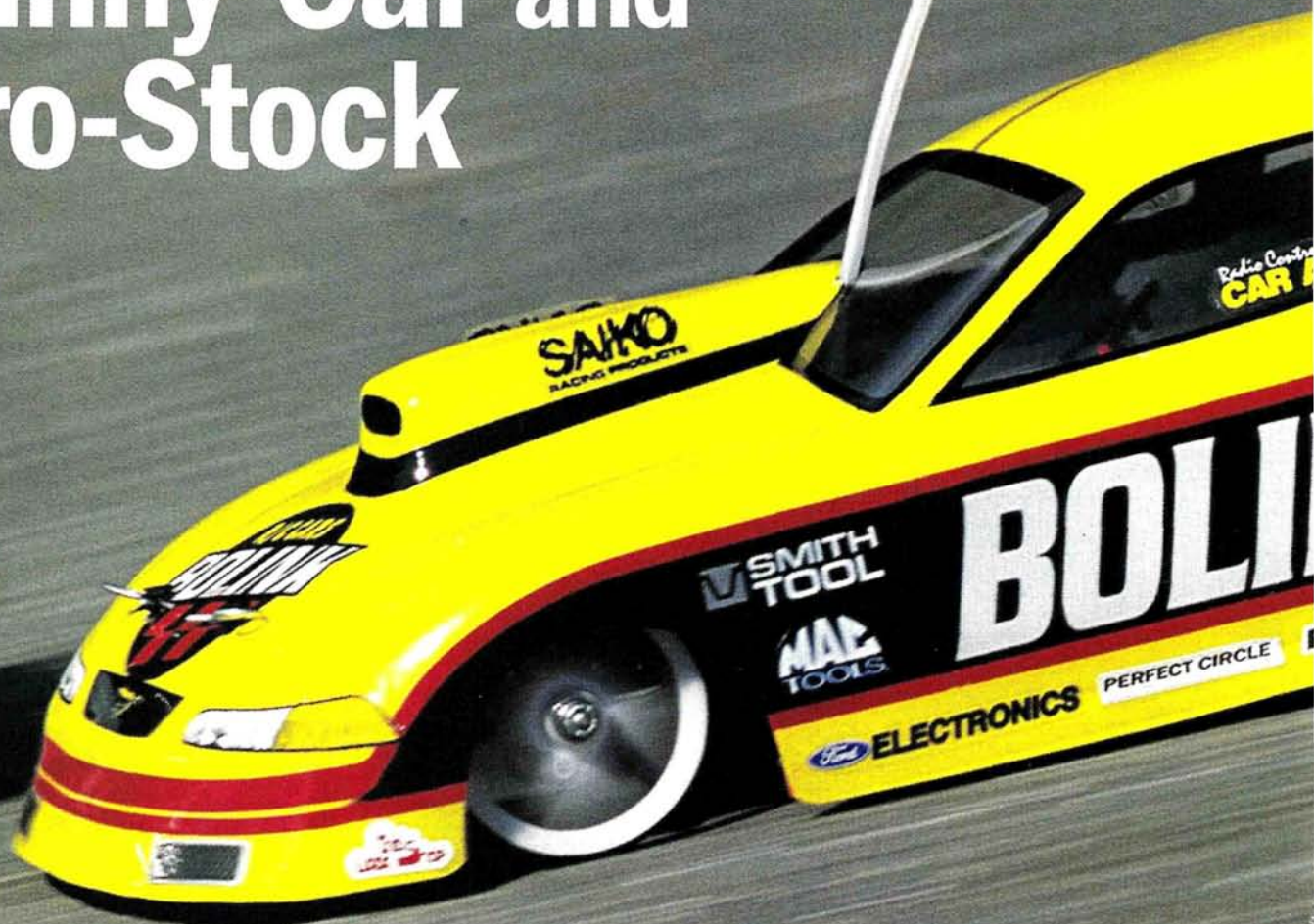
DURATRAX

distributed by Great Planes Model Distributors, 2904 Research Rd.,
P.O. Box 9021, Champaign, IL 61826-9021; (800) 682-8948;
www.duratrax.com.

KYOSHO

distributed by Great Planes Model Distributors, P.O. Box 9021,
Champaign, IL 61826-9021; (800) 682-8948; www.kyosho.com.

Bolink/Dragmaster Funny Car and Pro-Stock



Pulling the trigger on RC's most extreme machines

by Mike Ogle

Drag racing is perhaps the most unusual facet of American motor sports. All of the legendary names—Garlits, Prudhomme, Force, Glidden—and many other racers are products of the 1960s' American hot-rod culture. Even today, the vast majority of cars in the National Hot Rod Association are derivatives of American "muscle" cars. The thunder produced by these big 500ci-plus V-8s gives a sensation that you find thrilling or terrifying—but it's one that you'll never forget.

The guys at Bolink are big fans of all types of racing, so it was a natural for them to start producing RC drag kits. Their Econo Series dragsters, funny cars and pro stocks are very popular with budget-minded racers, and now Bolink offers the DragMaster line. The kits' graphite chassis and full-bearing wheels and axles can take you to the highest levels of competition, and they certainly deserve a close look.



COBALT, NEODYMIUM AND BEYOND

For years, RC drag racers have pushed the limits of motors and have experimented with rare-earth magnets and exotic winds. Back in the early '90s, AstroFlight motors, with their distinctive gold-colored machined cans and large brush "ears," were the undisputed high-horsepower motors of choice on the West Coast, and Chris Fine of Fine Design's German-made Hektolett Big One was the East Coast favorite. Chris later developed his own cobalt-magnet .05 motor—the Cordite Series—and it dominated during the mid-'90s.

Today, a number of other manufacturers produce motors specifically for drag-racing. Most notable are former Californian Steve Saiko and his G-Force motors. Steve, a one-time oval racer, just wanted to go faster and faster, and he found his true calling with drag racing. Working closely with "Big" Jim Greenmeyer, he put in months and months cooking up exotic-wind cobalt and neodymium motors on his specially modified dyno. Their results smashed just about every record in the IEDA books, including the all-time fastest elapsed time for a Top Fuel dragster—Chris Collins' 1.647 second—and the land speed record of 112.7mph set in a special 300-foot competition at Northstar Speedway in Minnesota.

Roy Anderson of Grand Motorsports also produces some of the fastest purpose-built drag motors, and he has some of the fastest alcohol (10-cell) cars in the nation. Check out Grand Motorsports at www.grandmotorsports.com.

DATA CENTER

VEHICLE TYPE 1/10-scale electric drag-racing chassis, Pro-Stock and Funny Car

BEST BUYER Racers who want to get into RC drag racing with a more advanced chassis that can handle outrageous horsepower

KIT RATINGS (poor, satisfactory, good, very good, excellent)

Instructions Good

Parts Very good

Durability Very good

Overall performance Very good

SPECIFICATIONS

SCALE 1/10

LIST PRICE \$289.99/\$299.99

DIMENSIONS

Pro-Stock/Funny Car

Wheelbase 11.0 in. (279.4mm)/

13.0 in. (330.2mm)

Weight 44.64 oz. (1,265g)/

46.4 oz. (1,315g)

CHASSIS

Type Single-deck graphite

pan chassis

Material Graphite

DRIVE TRAIN

Type Pinion/spur

Axle Solid aluminum

Differential None

Bearing type Metal-shielded ball bearings

SUSPENSION

Type (F/R) Spring over kingpin/pivot-ball T-bar; ride-height/pull-bar adjustment rod

WHEELS

Type (F/R) One-piece machined Delrin/one-piece plastic

TIRES

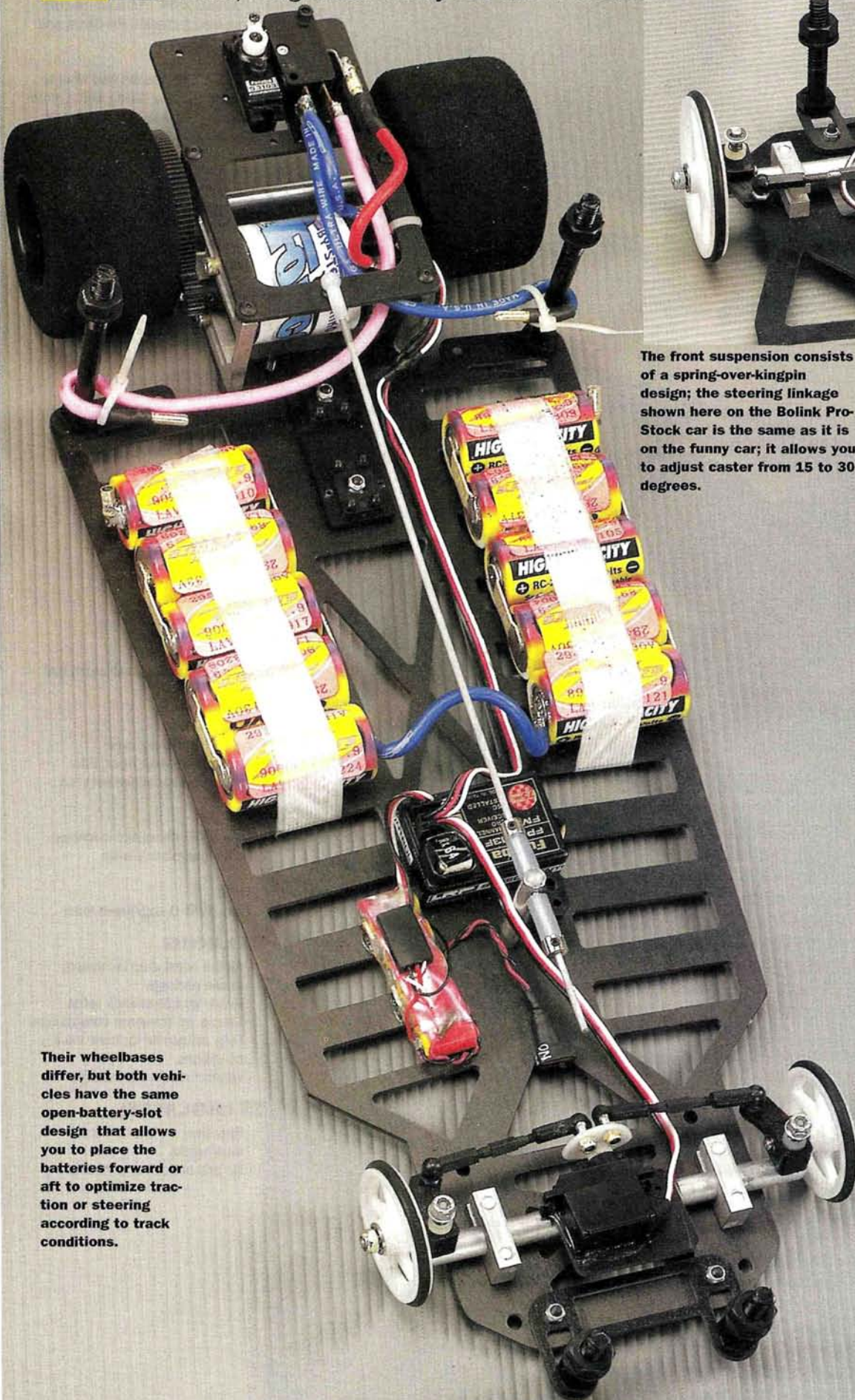
Type (F/R) O-ring/green foam

LIKES

- All the latest drag technology in one package.
- Ready for microswitch setup.
- Simple, no-nonsense construction.
- Fully adjustable for most track conditions.
- Window masks are included.

DISLIKES

- Rear tires are too firm for most tracks.
- No grill or headlamp decals.



Their wheelbases differ, but both vehicles have the same open-battery-slot design that allows you to place the batteries forward or aft to optimize traction or steering according to track conditions.

The front suspension consists of a spring-over-kingpin design; the steering linkage shown here on the Bolink Pro-Stock car is the same as it is on the funny car; it allows you to adjust caster from 15 to 30 degrees.

building & setup tips

There isn't much to assemble in an RC drag-racing kit, but even so, you may find these points helpful.

Step 3. The aluminum pinch blocks that hold the front beam axle do a good job when new, but if you want a more foolproof lock on your caster settings, drill and tap a 4-40 setscrew into the top of one of the blocks to secure the front axle beam in place.

Step 5. After pushing the kingpins into place, polish them with a buffing wheel on your Dremel tool. It seems like a little thing, but a smooth front suspension can help your car track more positively by eliminating any momentary stiction in the front end.

Step 9. The tweak screws are very helpful in getting straight launches. After fully loading it with the motor, servos and batteries, tweak the car as indicated in the instructions.

Servo adhesive. The itsy-bitsy servos used in drag cars can be mounted conventionally using the mounting ears, but a lot of racers just use Shoe-Goo, the racer's friend, to attach them. It's light and strong and it works.

YOU'LL NEED

- 2-channel radio
- Throttle and steering servo
- Microswitch
- Motor
- Polycarbonate-compatible paint

KIT FEATURES

• **Chassis.** The DragMaster Funny Car kit and the Pro-Stock kit are based on a graphite-plate chassis for the highest possible strength-to-weight ratio. The motor pod's top and bottom plates and the front steering servo and the body-mount plates are graphite, too. The chassis' most striking features are the 20 battery slots—not that you would ever need to use all of them for batteries, but you will be able to position your 8 or 10 cells fore or aft on the chassis to get the best launch. Position the cells too far back, and you'll get excellent traction, but you'll also run the risk of violent, uncontrollable wheel stands. Position the cells too far forward, and you could get excessive wheel spin.

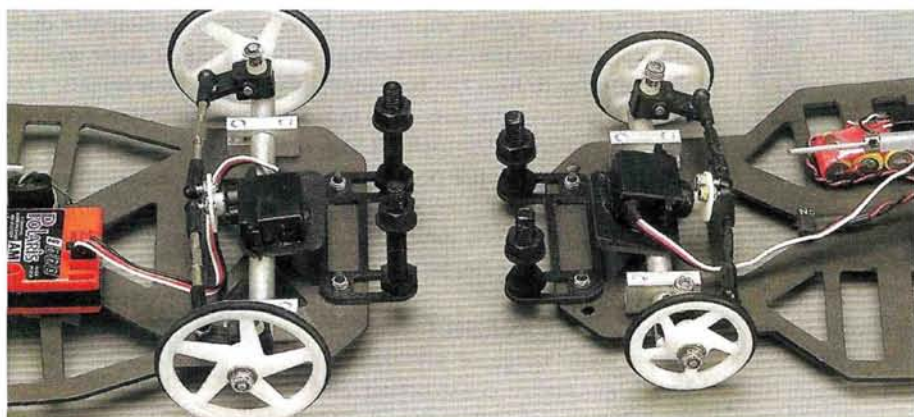
• **Suspension and steering.** The suspension borrows heavily from existing oval and on-road pan-car technology. The front end features a solid aluminum crossbeam with spring-over-kingpin damping. Great-looking Delrin 5-spoke front wheels are grooved to

fit neoprene O-ring front tires. This simple, effective front end is perfect for RC drag racing, as it allows you to tilt the kingpins back to increase caster (typically 15 to 30 degrees). That caster increase slows initial steering response (a good thing at 70mph plus), and the little, thin "pizza-cutter" front wheels offer absolutely minimal rolling resistance.

A notable feature of both DragMaster kits is the upper "pull bar" that is attached to the motor pod at the rear and runs through an aluminum standoff at the front of the motor. It's the equivalent of a pan car's center shock, but it's a lot longer. This unique device does two things: it allows you to set your car's ride height (when it's fully loaded with batteries) by scooting the adjustment collars to put "preload" into the chassis, and it allows you to adjust how much "arch" you want in the chassis on takeoff. If you run on a dusty, rough surface where traction is hard to find, you'll probably want to soften the car up to let it "bite" the track better. Conversely, on a high-bite, glass-smooth superstrip,

you'll want to stiffen the car so that all the energy is transferred into forward motion. Experimentation is the rule here!

Although similarly constructed, the Pro-Stock (left) is wider and features larger wheels than the Funny Car (right).



Futaba 3PJS PCK radio

I remember accidentally leaving my 20-cell Top Fuel dragster sitting on my workbench while it was switched on. Even though 30 cars ran right in front of it, my car never even twitched—a true testament to the radio's ability to reject signals; the fail-safe function is also a real insurance policy. I trust nothing else.

Futaba S3103 servos

These small wonders may seem too small for steering a multi-cell dragster, but with 17.3 oz.-in. of torque and 0.011 second for 60 degrees of travel, they're plenty strong and really fast.

Reedy Zappers 2400 batteries

Zapped cells have done their part to break most of the established drag-racing records, and Reedy zapped 2400s are among the punchiest in the business. They will undoubtedly zap away a few more records in the upcoming season.

Saiko drag motors

Yikes! These are stump-pullers! Each low-turn motor is hand-wound and features a machined can, copper end-bell and is dyno-tuned for drag racing.

Power on! Mastering the microswitch

Both of the DragMaster cars featured here were outfitted with a single 25A microswitch throttle setup. This is one of the easiest, most cost-effective and fastest methods of power delivery for powering any drag car. The basic operation is very simple: at rest, i.e., whenever you're off the throttle, the motor is shorted to itself; essentially, that means full braking. When the servo swings over to depress the little button on the microswitch, it's at full power—right now, baby! This is the most basic setup, and it's great for beginners because it's hard to get into trouble if you're either full off or full on.

You can also wire up a dual-microswitch setup in which one switch handles the throttle and the other handles braking. The big advantage to this setup is that you also have a neutral position for coasting: the car doesn't go into full lockup when you get off the throttle. This is much easier on gears, tires and the drive train in general, and it's the setup that I usually run.

Besides the instant "thunk" of a microswitch, its hidden advantage is that savvy racers will

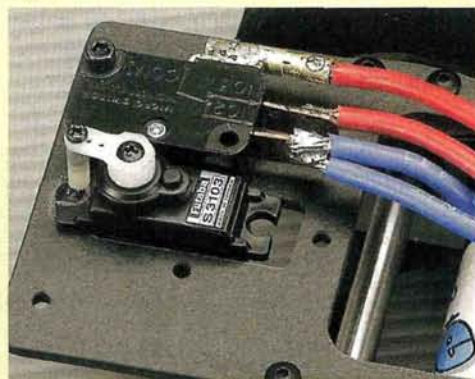
use the servo's transit time as a sort of delay box to cut a nearly perfect reaction time at the starting line. Here's how: pull full throttle when you see the last yellow lights (or, on a pro-start, simultaneous yellows). Read your reaction time off your time slip; you'll most likely have left too quickly (resulting in a red-light start—a foul). Now, back the throttle servo arm away from the switch a few clicks with your radio and try it again. Keep practicing until you get a throttle-delay time that's just a few hundredths over the time that elapses between the

flash of the last yellow light and the flash of the green light (0.400 second on a pro-tree, and 0.500 second on a full or handicap tree).

Both microswitch setups require the use of a separate, small receiver pack of batteries to

power the radio, steering and throttle servos. Some racers use a voltage-dropping diode that's wired into the main battery pack to separately power their radio and servos, but I've seen a lot of their cars take off into the woods because of a "minor" component failure. You can use an electronic speed control if you prefer, but be sure to avoid exceeding the maximum number of cells recommended by the

manufacturer, or it might be smoke city for your expensive controller.



You're looking at the ultimate in throttle simplicity; most drag racers use this same style of servo-driven microswitch.

TRACK TEST Bolink/Dragmaster Funny Car and Pro Stock

• **Drive train.** At the rear of the DragMaster Funny Car is a separate motor pod that's mounted on the chassis with a fiberglass T-bar/pivot-ball setup and two very useful tweak screws. A full-size, aluminum motor-mounting plate on the right side has very long slots for the motor-mounting screws; this feature allows a wide range of motor adjustment that can accommodate a pinion and spur gear of almost any size. The left side is mostly open; it has an aluminum, rear axle bearing-support piece and an aluminum-tube standoff to allow easy motor access.

The chassis' graphite top plate is slotted to accommodate the small servo that activates a microswitch "throttle"—the preferred power-delivery method in most upper-level classes of the International Electric Drag Racing Association (IEDA) and National R/C Hot Rod Association (NR/CHRA). To power the DragMaster Funny Car in my initial test session, I used a Reedy Ti 9-turn modified and 10 Reedy 2400 zapped Ni-Cd cells that provide gobs of punch.



• **Body, wheels and tires.** The Funny Car kit comes with a new Mustang body that highlights the distinctive narrow cockpit that the John Force stable of cars sported. With its rounded "shoulders" and ex-tended hood, the body is surprisingly rigid; it should be stable even under the air pressure of a 70mph-plus run. The rear deck spoiler and side plates are molded in, although if you wanted more rear downforce, it would be very easy to enlarge them with additional pieces of flat Lexan sheet.

I painted the Mustang shell in the 2001 John Force colors—white and black—and used my Roland Stika vinyl-design cutter to make the Bolink GTX logos. The Pro-Stock also comes with a Mustang body complete with a molded in "snorkel"-style hood scoop and a separate rear deck spoiler. I painted this one in Team Jeg's colors (it's an auto-parts store), again adapted for the Bolink theme.

The green-compound rear tires and wheels that come in the DragMaster kits are fine for your initial setup, but as soon as you pour serious horsepower such as a cobalt motor and 10 cells into your car, you may need a set of super-soft drag foams to hook it up. I called Kent Vahlsing at Northstar Speed Shop in Minnesota to get a set of his rear foam tires on black, 1/12-scale wheels. These are a super-soft compound, and the small-wheel/large-foam combo is preferred by many racers because it provides great traction on less than perfect track conditions.

PERFORMANCE

The Funny Car initially had trouble gripping my local uneven Rialto, CA, track's concrete runway surface, but after a tire change, a liberal application of Tire Bite traction compound and a battery-cells' repositioning (to the second most rearward slot), the car found the bite it needed. It pulled some pretty good numbers, including a best through the lights at 64.8mph.

After getting the traction and handling reasonably under control, I couldn't resist bolting in one of Steve Saiko's G-Force neodymium-magnet motors just to see what the DragMaster would really be capable of. These motors are torque monsters and are hand-built for drag racing. The G-Force has a uniquely machined can, special winds and Powersurge's Hi-Graphite drag brushes. You feel there's something different about these motors when you try to turn the bare motor shaft with your fingers; you can't! The neo magnets are too strong. The Saiko-powered DragMaster Funny Car took off like a bat out of hell, but it never fully hooked up on the porous concrete. It spun the middles out of its rear tires and then wagged its tail in ever increasing arcs throughout the run. I never had the nerve to fire it all the way through the timing beams!

THE VERDICT

With a wide range of adjustability, their high-quality construction and top-drawer materials, the Bolink DragMaster Funny Car and Pro-Stock kits will let you build a vehicle that can compete at any level of drag racing. It's great to see an American manufacturer mass-producing kits in a wide variety of prices for RC drag-racing fans. It's the fastest RC motor sport, and these DragMaster kits can take you as fast as you wanna go! ■

SOURCE GUIDE

BOLINK R/C CARS INC.
420 Hosea Rd.,
Lawrenceville, GA
30045; (770) 963-0252;
www.bolink.com.

FUTABA
Distributed by Great
Planes Model
Distributors Co., P.O. Box
9021, Champaign, IL
61826; (800) 682-8948;
www.futaba-rc.com.

GRAND MOTOR-SPORTS
9360 Newton Ave. N.,
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55444; (612) 424-5535;
www.grandmotor-sports.com.

REEDY
A division of Team
Associated, 3585
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Mesa, CA 92626; (714)
850-9342; www.teamas-sociated.com.

ROLAND: DGA GROUP
15271 Barranca Pky.,
Irvine, CA 92618; (800)
542-2307; www.roland-dga.com.

SAIKO
www.immortalforce.com

SITES TO SEE

For a lot of good discussion and helpful drag-racing tech tips, see these websites:

IEDA (includes discussion board) ■ <http://members.aol.com/iedarcdrag/race.html>.
NRCHRA ■ www.rcdragracing.com.

Also check out these RC drag-racing related sites:

Northstar Dragway & Speed Shop ■ <http://members.atp://www.grandmotorsportol.com/nrthstrrc/index.html>.
Grand Motorsports ■ www.grandmotorsports.com.
Saiko's Immortal Force Motors ■ www.immortalforce.com.
FM Performance ■ www.arrowhobbies.com.
Race America Timing Systems ■ www.raceamerica.com.

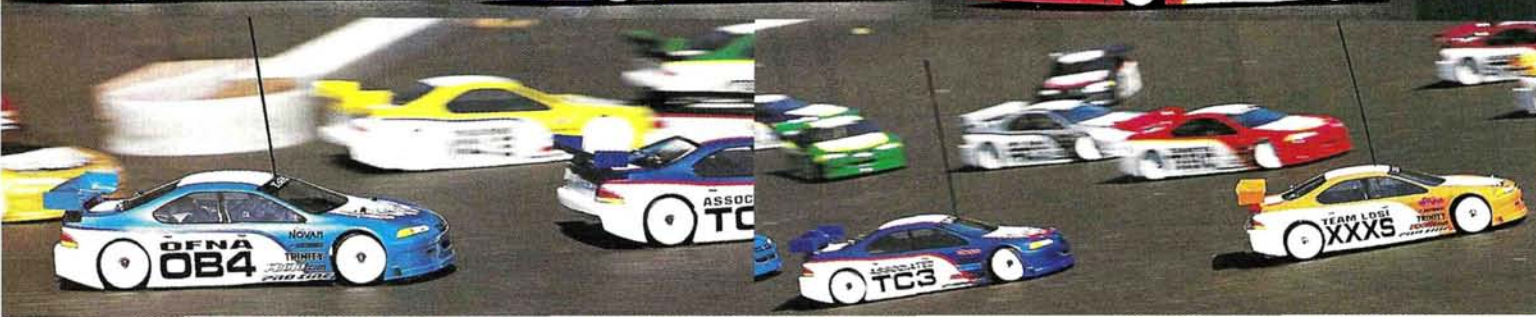




Pro Electric **SMACK**

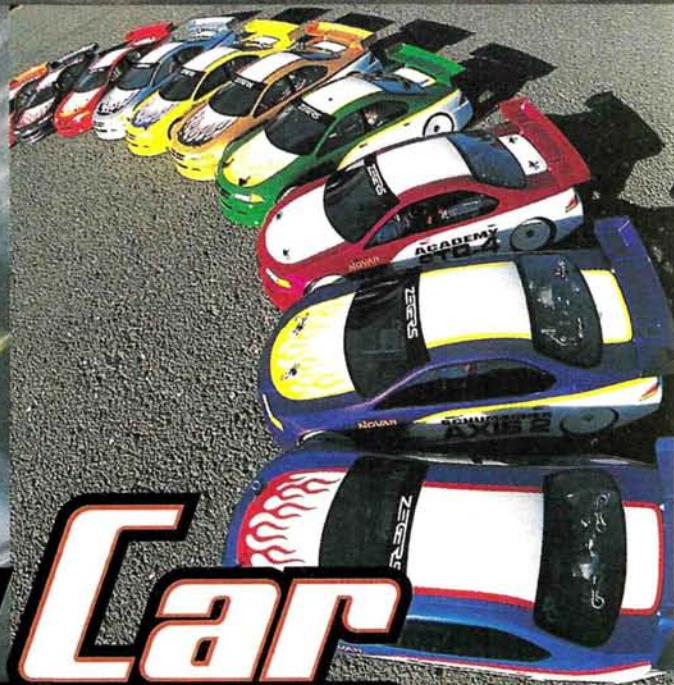
eleven ways
to win

by Derek Buono, Greg Vogel & Peter Vieira

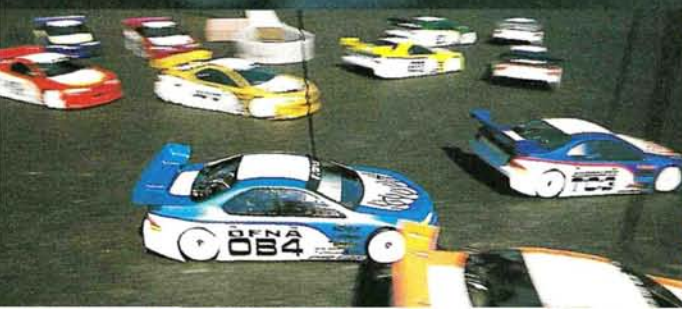




Touring Car DOWN



Right now, there is no more hotly contested category of electric RC competition car than that of touring sedan. There are no fewer than 11 raceworthy, top-of-the-line cars available, and there isn't a loser in the bunch. So how do you pick one? The best way would be to set all 11 cars up with identical batteries, motors, tires and bodies, then test and tweak all of them until you found the car that got around the pipes fastest for you. Yeah ... like that's gonna happen. As Joe RC Guy, there's little chance you could put together such a mega test drive—but we can. And did.



HOW WE RATED THEM

Lap times are important, but so is feel; here's what we considered as we judged the handling of the cars.

ACCELERATION

With identical batteries, motors and gearing, all the cars were equally quick, but that doesn't mean they accelerated equally well. High-scoring cars hooked up and launched straight seamlessly while those that scored less may have got loose, experienced wheel hop, or had other difficulties.

TURN-IN

Straight-line speed is useless if your car doesn't want to turn (unless you're drag racing, of course). Top scores were awarded to cars that didn't fight the wheel and entered turns aggressively without getting loose beyond the limits of control.

CORNER SPEED

We're all for traction, but if a car grips the road so well that it burns off a lot of speed in the turns, it will be gripping the track all the way to last place. Likewise, a "loose is fast" setup that requires you to tiptoe through the turns for fear of spinning out is better described as "loose is slow."

TRANSITIONAL HANDLING

The typical club touring-car track packs a lot of turns into a tight space, so the ability to quickly transition from left turns to right and back again is crucial. Top-scoring cars kept their composure when we sawed at the wheel; lower scoring cars lost their groove.

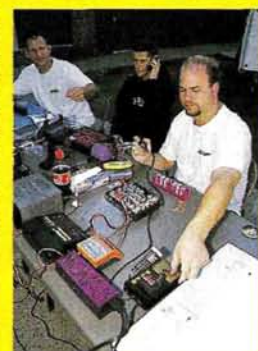
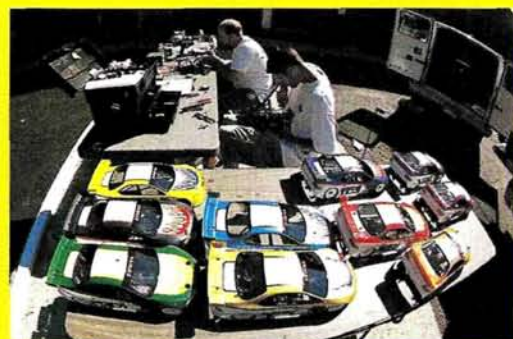
OUR TESTING PHILOSOPHY

Stock parts only. All the cars were built using only the parts included with the kit (with the exception of wheels, tires and bodies), installed as suggested by the included instructions.

Identical equipment. The cars were equipped with identical electronic gear, tires, wheels, inserts and bodies (see "Test Gear" for details). Final drive ratios were identical, but actual pinion- and spur-gear tooth counts varied owing to differing internal transmission ratios. After assembly, each car was dialed in to the suggested starting setup using a Hudy setting board and Hudy gauges.

Asphalt setup. We didn't think it would be fair to consider a car a flop just because its stock setup wasn't perfect for our track, so changes in toe, camber, wheelbase, shock angle, ride height and any other available adjustment options were allowed. We don't claim to have found the perfect setups for all 11 cars (that takes weeks), but we did tune the cars well enough to race.

Same-day testing. All 11 cars were rotated continuously through three test drivers throughout each test day, so no car could enjoy faster laps because of more favorable track conditions.



ON TRACK

All testing was done with an AMB transponder system at RC Madness in Enfield, CT, on the shop's fresh asphalt track. Madness packs a lot of driving challenge into its layout, and the solid boards that define the circuit punish sloppy driving by shattering hub carriers and shredding suspension arms. For testing durability and performance, Madness was the track of choice.

TECH SPECS	ACADEMY STR-4	ASSOCIATED TC3	CORALLY C4.1	HPI RS4 PRO-3	KYOSHO KX-ONE
Weight (oz./grams)	45.19/1281	44.83/1271	45.33/1285	46.42/1316	45.93/1302
Wheelbase (in./mm)	10.12/257	10.18/259	10.40/260	10.2/258	10.2/259
Width (in./mm)	7.36/187	7.5/190	7.56/189	7.4/188	7.4/188
Chassis material	Woven graphite	Molded graphite	Woven graphite	Molded plastic	Woven graphite
Transmission ratio	2.75:1	2.5:1	1.88:1	2.25:1	1.95:1
Drive system	Shaft	Shaft	Dual belt	Dual belt	Single belt
Included pinion/spur gear	24/70	23/72	—/90	35/116	43/110
Drive shafts	Universals	MIP CVDs	Universals	MIP CVDs	Steel universals
Differential (F/R)	Ball/ball	Ball/ball	Ball/ball	Ball/ball	One-way/ball
Bearing type	Metal shielded	Teflon shielded	Metal shielded	Rubber sealed	Metal shielded
Shocks	Threaded aluminum	Threaded aluminum	Threaded plastic	Threaded plastic	Aluminum
Turnbuckles	Aluminum	Titanium	Steel	Steel	Steel
Tires	Slicks	Not included	Slicks	Not included	Not included

ADJUSTMENT OPTIONS (Front/Rear)

Caster (degrees)	10, 7.5, 5	2, 4	8-15	6, 8, 10	Fixed
Kickup/anti-squat (degrees)	1, 2	0, 2/0, 2	0/0.5-3	0, 2/0, 2	Fixed
Camber (F/R)	Yes/yes	Yes/yes	Yes/yes	Yes/yes	Yes/yes
Track (F/R)	No/no	No/no	Yes/yes	No/no	No/no
Toe-in (F/R)	Yes/no	Yes/yes	Yes/yes	Yes/yes	Yes/no
Upper shock positions (F/R)	2/3	3/3	3/6	2/3	7/9
Lower shock positions (F/R)	2/2	1/1	1/1	2/2	3/3
Inboard camber positions (F/R)	4/5	4/4	1/7	4/4	2/4
Outboard camber positions (F/R)	1/2	1/2	1/1	3/3	1/2

INCLUDED GEAR

Body	No	No	No	No	No
Wheels	Yes	No	Yes	Yes	No
Tires	Yes	No	Yes	No	No
Other	Spare spur gears	Dummy transponder	—	—	—
Street price	\$220	\$299	\$299	\$219	\$369

Novak Cyclone TC2 ESC and XXtra receiver

Equipping our test cars with Novak's touring-car-specific Cyclone TC2 was a no-brainer. We left all the TC2s in the default "modified" profile for testing.

We installed Novak XXtras in all the cars and programmed three radios to cover all 11 cars. We never had to change a crystal!

Trinity VIS Extra Stock Metal Hydride pack

Panasonic's Stock Metal Hydride cells are the current kings of nickel-metal voltage, and Trinity's Voltage Increasing System (VIS) regimen and custom matching only makes them better.

Trinity Caliber modified motor

With an eye toward saving a few bucks and keeping the cars as alike as we could, we installed Trinity's machine-wound, ball-bearing 10-turn Caliber budget mods.

Pro-Line H13 ST tires and Velocity wheels with Jaco inserts

We didn't want to deal with tire changes during testing, so we installed Pro-Line ST slicks in the long-wearing H13 compound. Greg glued all 44 tires after losing a bet.

Airtronics 94755 digital steering servo

Airtronics' first digital servo is ideal for touring car use with its quick, 11-second transit time and 81 oz.-in. of torque.

Protoform Dodge Stratus body

Racers still prefer Stratus shells, so we installed 190mm units from Protoform. Included window masks and decal sheets with details and logos make it easy to get good-looking results. Paint by Bill Zegers at Zegers Grafix.



EDITORS WEIGH IN

Peter Vieira

As a diehard "chassis man", I pick the **XRAY T1** as the best car here. With its pristine graphite chassis plates, hard-coated Duraluminum bulkheads and finely finished aluminum and spring-steel parts, the T1 is irresistible to anyone who appreciates the no-compromise school of RC car design. But the T1 is more than just a pretty car; it's also the most adjustable as well as the easiest to adjust. There's no doubting the T1 can be dialed in to do whatever you want it to.

HONORABLE MENTION

Corally C4.1. Although it lacks some of the details that make the T1 my favorite, the Corally is still among the best of the pivot-ball tourers.

Kyosho KX-One. On high-traction pavement, the KX-One handled much better than it did for my Track Test in the October 2001 issue.

Academy STR-4 Pro. I'm just a sucker for this car because it looks so good, but it's a competent racing machine in its own right.



Derek Buono

My pick is the **Yokomo MR4 Special**. Not only does it come jam-packed with every available option in the box, but it also handled extremely well with the stock setup. To me, it felt slightly more stable than most of the other cars, and that stability translates into consistently fast laps.

HONORABLE MENTION

Losi Triple-XS. The XXX-S will win a lot of races. I found it to be the easiest car to drive fast.

Schumacher Axis 2. It has won too many national championships to mention, and it also turned the fastest single lap during testing.

FT TC3. There is a reason we chose the TC3 as Car of the Year: it performs out of the box, its super-efficient shaft drive puts the power down, and the Factory Team edition gives you every option you could want.



Greg Vogel

The **Triple-XS** is the best car here; it was so easy to drive, it's as if Team Losi had set up secret spy cams where I race to record my driving and then provided its general setup based on my driving ability. The Triple-XS was tuned perfectly to my driving style. The car just felt extremely stable, had excellent acceleration and steering and was all around the easiest to drive.

HONORABLE MENTION

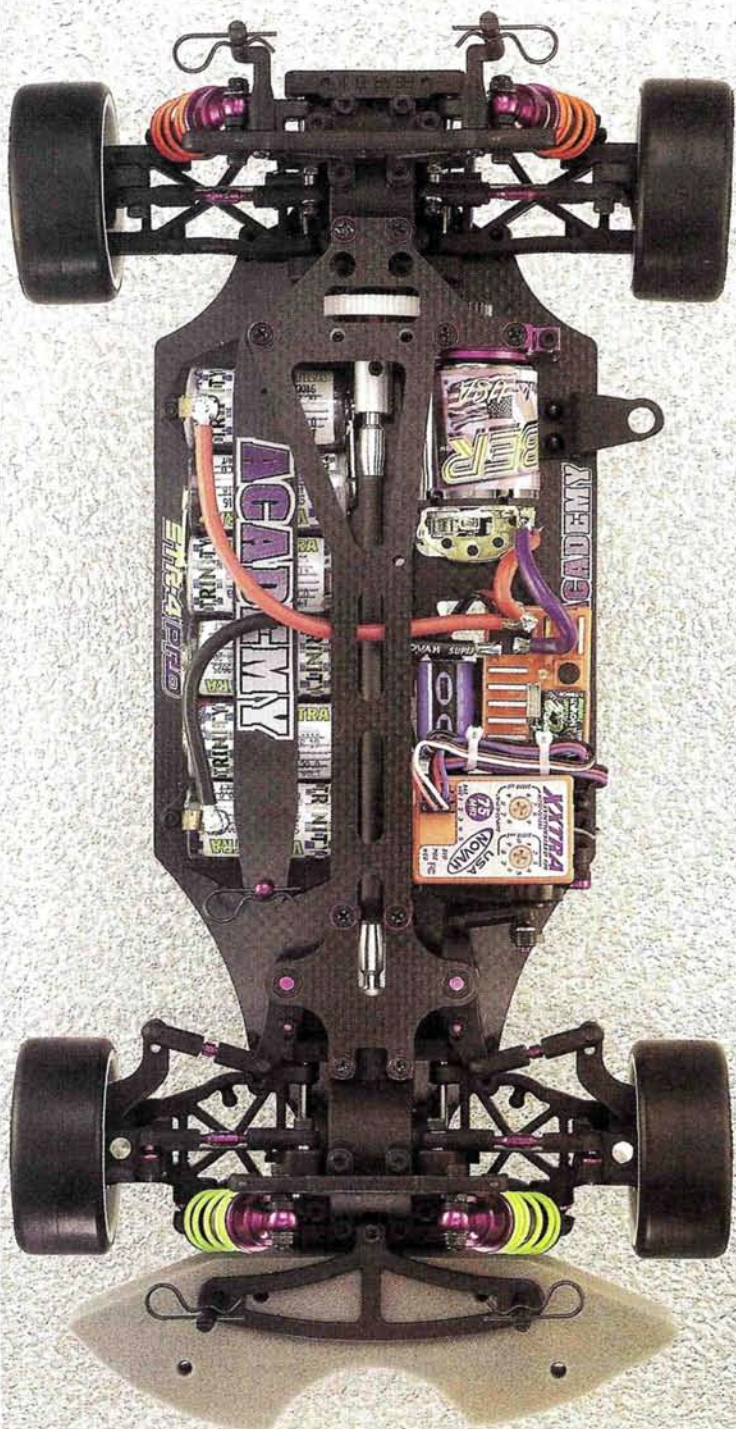
HPI Pro 3. I also found the Pro 3 easy to drive, and any minor setup flaws didn't cause any problems getting the car around the track at an acceptable lap time.

OFNA OB-4. The OB-4 is a great transition car for anyone looking to have a good time on the race scene and parking lot.

Tamiya Evo. It's tough to beat Tamiya in terms of pure quality. The Evo is has lots of eye-candy with its graphite and aluminum upgrade parts, and fit and finish are impeccable.



OFNA OB-4	AXIS 2	TB EVOLUTION	LOSI TRIPLE-XS	XRAY T1	YOKOMO MR-4 SE
44.34/1257	45.57/1291	47.3/1341	47.09/1335	44.76/1269	45.68/1295
10.4/260	10.24/256	10.02/254	7.38/187.5	9.9-10.3/252-261	10.32/258
7.5/187	7.52/188	7.36/187	10.12/257	7.5/190	7.56/189
Woven graphite	Woven S1	Carbon fiber	Stiffexel	Carbon fiber	Molded graphite
2.33:1	2.0:1	2.6:1	1.83:1	2.125:1	2.2:1
Dual belt	Dual belt	Shaft	Single belt	Dual belt	Dual belt
36/124	-/86	35/88	20/87	25/93	22/81
CVA/dogbone	Plastic CVDs	Steel universals	MIP CVDs	Steel universals	CVDs
Ball/ball	Ball/ball	One-way/ball	Ball/ball	Ball/ball	One-way/ball
Metal shielded	Shielded	Rubber sealed	Metal/Teflon shielded	Metal shielded	Metal shielded/rubber sealed
Threaded aluminum	Aluminum	Threaded aluminum	Hard anodized aluminum	Threaded plastic	Threaded aluminum
Steel	Steel	Steel	Steel	Spring steel	Titanium
Slicks	Treaded slicks	Treaded slicks	Racing slicks	-	-
Adjustable	7.5,10,12.5	Fixed	Fixed	1-11	Fixed
Fixed	0, 1.5	0, 2	0, 2, 4 degrees	0, 1.5, 3/0, 3	Fixed
Yes/yes	Yes/yes	Yes/yes	Yes/yes	Yes/yes	Yes/yes
No/no	No/no	No/no	No/no	Yes/yes	No/no
Yes/yes	Yes/yes	Yes/no	Yes/yes	Yes/yes	Yes/no
6/6	5/5	3/3	4/4	3/3	3/5
2/3	2/2	2/2	2/2	2/2	2/4
1/3	2/2	1/1	4/4	1/1	6/7
1/2	2/2	1/2	1/2	1/4	1/2
Yes	No	No	Yes	No	No
Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes	Yes
Radio, ESC, 540 motor	-	Spare spur gears	Overdrive pulley	One-way diff option	-
\$349	\$219	\$419	\$229	\$325	\$299



Academy/MRC STR-4 Pro

Academy's top-of-the-line STR-4 bears little resemblance to the entry-level model it shares its name with. In Pro trim, the car is very well equipped and proved to be a capable performer with only minor assembly glitches (namely, sticky shock-shaft guides). Shaft drive is a plus, and the STR-4 Pro was one of the best accelerating cars tested.

AT A GLANCE

Street price \$219.99
Battery configuration Stick/
 side-by-side pack
Drive-train type Shaft
Weight, as tested 45.19 oz.
Fastest lap (sec.) 19.1

FEATURES

- Full graphite package; lower chassis plate, upper decks, battery brace and shock towers.
- Threaded-aluminum shocks.
- One-piece, purple-anodized motor mount and shaft support.
- Aluminum-tipped graphite drive shaft.
- Adjustable servo-saver.
- Aluminum hex-hubs.
- Full-time 4WD.
- Front and rear universal-joint drive axles.
- Steel diff outdrives.

PERFORMANCE

ACCELERATION



The STR-4 was very quick, but had a little torque steer.

TURN-IN



Due to a soft suspension setup and relatively flexible suspension parts, the STR-4 didn't turn in as hard as other cars.

CORNER SPEED



Once committed to a turn, the STR-4 carried its speed well.

TRANSITIONAL HANDLING



Although the effects of its somewhat soft plastics were felt in the corners, the car was nimble from corner to corner.

BONUS

- Shaft drive is impervious to dirt, grit, carpet dust, etc.
- Nicely finished graphite parts and purple stuff.
- Includes three spur gears.

BOGUS

- Won't accept "standard" spur gears.
- Shocks needed some hand-fitting to operate smoothly.

ACADEMY/MRC, 80 Newfield Ave., Edison, NJ 08818-6312; (732) 225-6360; www.modelrec.com.



Spacers on the outboard hinge pin adjust the wheelbase, and short aluminum turn-buckles are standard.



The motor plate and spur-gear support are machined from the same hunk of aluminum, so gear mesh is perfect. A single pinch bolt secures the motor-mount cam adjuster.



Aluminum hex hubs are standard. Note the capped suspension arm.



Associated **Factory Team TC3**

The 2001 Car of the Year was a favorite during testing, thanks to the all-around good handling of the TC3 platform and the impressive spec of the Factory Team upgrades. Associated even includes a dummy transponder! A foam bumper is also standard, but not shown. The TC3's shaft drive was as effective (and crud-proof) as ever and provided solid acceleration and minimum rolling resistance.

AT A GLANCE

Street price \$299

Battery configuration Stick/
side-by-side pack

Drive-train type Shaft

Weight, as tested 44.83 oz.

Fastest lap (sec.) 17.7

FEATURES

- Full-time 4WD.
- Carbon-fiber drive shaft.
- Lightweight plastic diff outdrives.
- MIP aluminum drive shafts.
- Full graphite package: arms, chassis, shock towers, hubs/hub carriers.
- Factory Team blue-anodized hardware, threaded shock bodies, dummy transponder and motor mount.
- True Ackerman rack-type steering system.
- Volume-compensating shocks with Teflon pistons.
- Front and rear swaybars.

PERFORMANCE

ACCELERATION



The TC3's efficient shaft drive produces excellent acceleration with very slight torque steer.

TURN-IN



The FT TC3 stock setup had excellent turn-in characteristics on both sweeping corners and switchbacks.

CORNER SPEED



Full-time 4WD scrubbed a little speed, but the TC3 is still quick ...

TRANSITIONAL HANDLING



... especially in the switchbacks, where the dual diffs provided a more planted feel on the track.

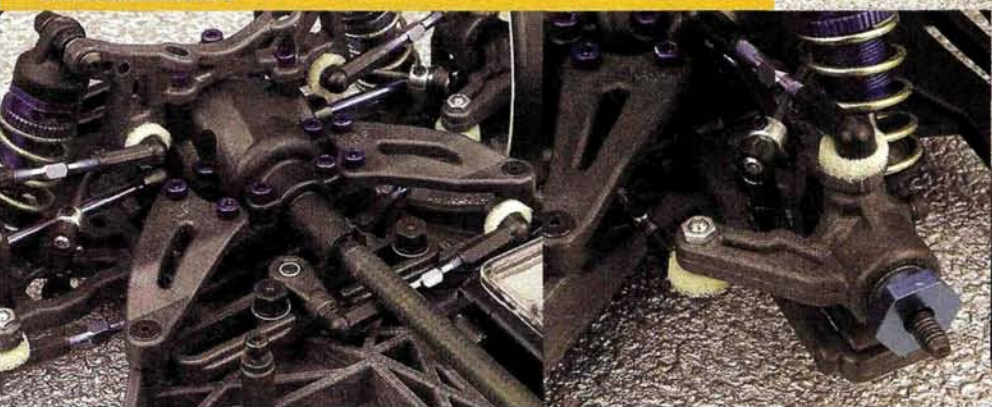
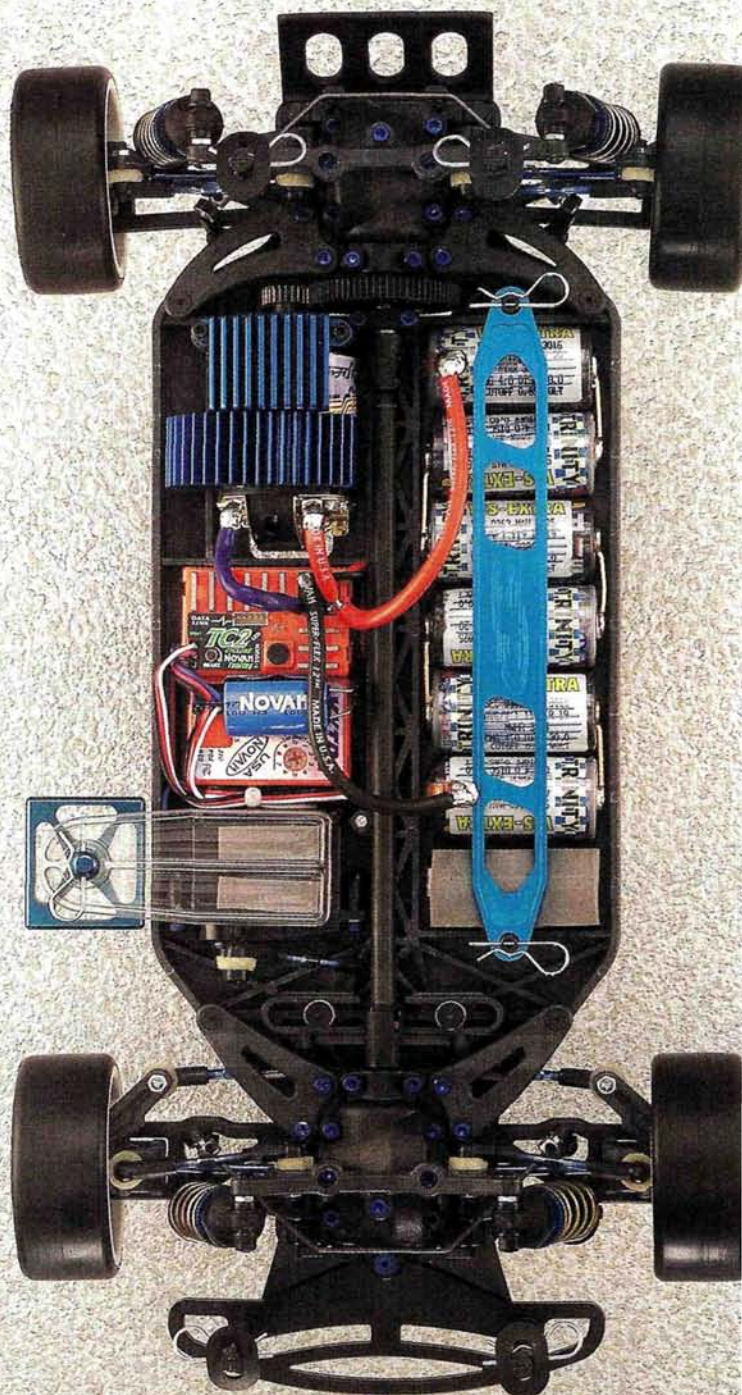
BONUS

- Shaft drive is impervious to dirt, grit, carpet dust, etc.
- Factory Team treatment includes titanium turnbuckles, threaded shocks, all the blue stuff.
- Front and rear swaybars are standard.

BOGUS

- Slight amount of torque steer under hard acceleration.
- Hub carriers required minor hand fitting for free suspension action.

TEAM ASSOCIATED, 3585 Cadillac Ave., Costa Mesa, CA 92626; (714) 850-9342;
www.teamassociated.com.



Associated's "True Ackerman" rack-type steering system provides consistent handling in all types of corners.

Capped suspension arms fight flex, and combined kingpin/ball studs help make the TC3 one of the easiest cars to drive fast.



Threaded VCS shock bodies and droop screws make the Factory Team TC3's suspension easy to dial in.



Corally C4.1

The original C4 impressed us with its superbly machined, gold-anodized chassis bulkheads and then exotic pivot ball suspension. The upgraded C4.1 gets a blackout treatment and now features adjustable rear camber links in place of upper wishbones. We had a little trouble with assembly due to less than stellar instructions and a poorly fitted top deck, but the completed car was easily tunable and ran well.

AT A GLANCE

Street price \$299
Battery configuration
 Saddle pack
Drive-train type Dual belt
Weight, as tested 45.33 oz.
Fastest lap (sec.) 17.8

FEATURES

- Pivot-ball suspension.
- Integrated hex hubs.
- Graphite chassis plates and shock towers.
- Black-anodized, machined-aluminum bulkheads.
- Adjustable one-way layshaft pulley.
- Teflon-coated 3mm front drive belt.
- Hardened-steel front hinge pins and drive shafts.
- Ball-bearing mono-crank steering.
- Aluminum outdrives and rear drive shafts.
- Threaded plastic shocks with externally adjustable damping.
- Insulated battery slots.

PERFORMANCE

ACCELERATION



The C4.1 accelerated hard without any sign of torque steer.

TURN-IN



The C4.1 had a slight push entering the corners.

CORNER SPEED



The car seemed to scrub a lot of speed with the front belt pulley set for full-time 4WD, but loosening the adjustable one-way increased corner speed.

TRANSITIONAL HANDLING



With such a stiff chassis, it was sometimes hard to keep the car pointed in the right direction through the twisty sections.

BONUS

- Artfully machined aluminum bulkheads and graphite chassis plates.
- Externally adjustable diffs and shocks.
- Adjustable front one-way pulley.

BOGUS

- Top deck required hand fitting.
- Instructions need improvement.
- Uncommon Torx fasteners.

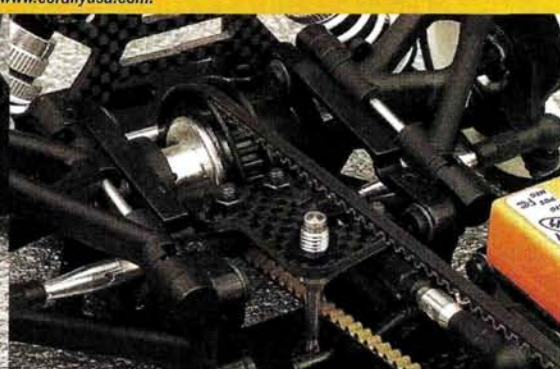
CORALLY USA; distributed by Specialized RC International, 1480 S.R. 436, Casselberry, FL 32707; (407) 681-5905; www.corallyusa.com.



Threaded-body Serpent shocks equip the C4.1 and feature externally adjustable damping.



The C4.1's hex hubs are machined as part of the axle assembly to run perfectly true.



A single graphite bellcrank points the C4.1's front wheels. Limited wrench clearance and hole-type turnbuckles make for time-consuming toe-in adjustments.



HPI RS4 Pro 3

After carefully evolving the RS4 line with the Pro and Pro 2 models, HPI's risk-taking, convention-busting Pro 3 was a shocker. With its unusually flexible chassis, super-wide diffs and high-rise hub carriers, the Pro 3 is quite unlike the cars it competes against. But its performance that counts, and the HPI car's unusual design did not provide unusual handling. After dialing it in to our track, the Pro 3 proved as capable as the other cars tested.

AT A GLANCE

Street price \$219
Battery configuration Stick/
 side-by-side pack
Drive-train type Dual belt
Weight, as tested 46.42 oz.
Fastest lap (sec.) 18

FEATURES

- Molded chassis with raised sides for increased cornering clearance.
- Down-the-center battery placement.
- Composite-plastic, threaded-body shocks.
- Steel turnbuckles
- Plastic outdrives.
- Front belt tensioner.

MOST AFFORDABLE

PERFORMANCE

ACCELERATION



We noticed a slight amount of torque steer under heavy acceleration.

TURN-IN



The Pro 3 had excellent turn-in and didn't appear to suffer from a seemingly flexible chassis.

CORNER SPEED



Cornering speed suffered slightly from the dual diff setup and flexible chassis, but the Pro 3 was very consistent.

TRANSITIONAL HANDLING



The Pro 3 had a very confident feel through the twisty sections but just wasn't quite as quick as the higher scorers in this category.

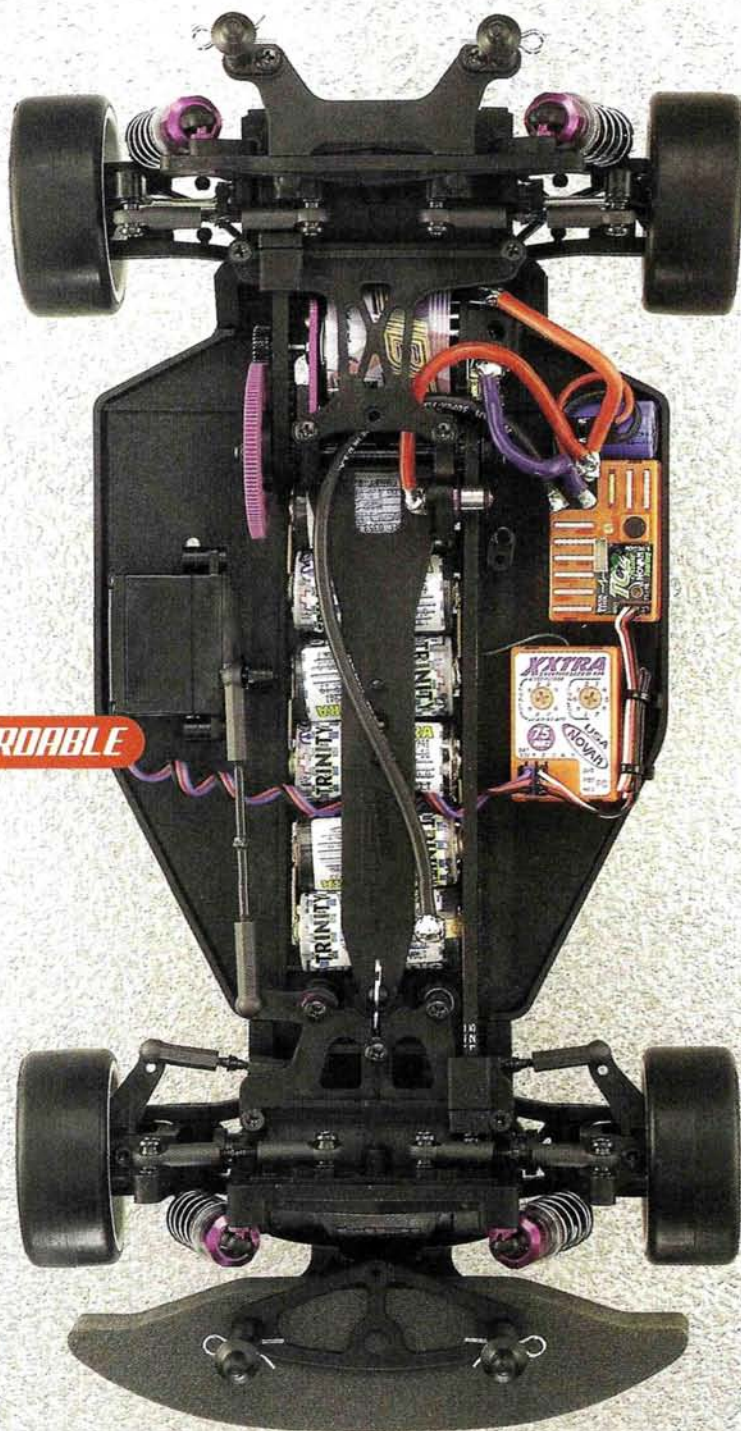
BONUS

- Easy battery in/out, lots of space for electronics.
- Chassis soaks up minor setup mistakes.

BOGUS

- Chassis flex slows the car in high-speed corners.
- Slight torque steer.

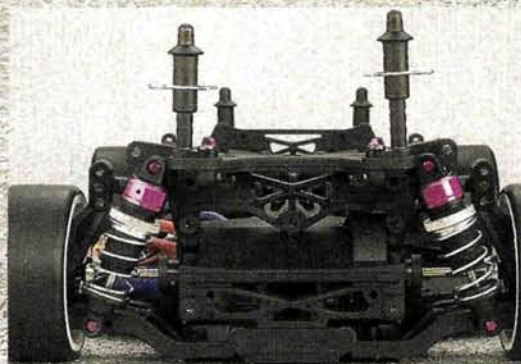
HPI RACING, 15321 Barranca Pky., Irvine, CA 92618; (949) 753-1099; www.hpiracing.com.



The tall molded-in standoffs that hold the camber links use "stacked" holes that make for significant roll-center changes.



As with the front hubs, the rear carriers have high-rise positions for the camber link.



The Pro 3's step-up suspension arms are required for differential clearance; note how wide the diff is and how short the CVD drive axles are.



Kyosho KX-One

The KX-One joins the HPI RS4 Pro 3 as one of the most unusual of the 11 test cars. The ladder chassis gives the KX an unmistakably narrow top view, and plastic "wings" are used to accommodate the electronics. Single-belt drive is the KX-One's other big feature—a feature shared with only one car in the "Smackdown" (the Team Losi Triple-XS). Chassis and mono belt notwithstanding, the KX-One is relatively conventional with suspension parts borrowed from the last Kyosho Touring Force car, the TF-4.

AT A GLANCE

Street price \$369
Battery configuration Saddle pack
Drive-train type Single belt
Weight, as tested 45.93 oz.
Fastest lap (sec.) 18.4

FEATURES

- Single-belt drive train.
- One-way front differential.
- Lightweight plastic rear outdrives.
- Graphite ladder chassis and shock towers.
- Down-the-center battery placement.
- Aluminum shocks with variable-damping Teflon pistons.
- Front and rear swaybars.
- Included aluminum pinion.

PERFORMANCE

ACCELERATION



The centered, single-belt drive train made for quick, straight launches but the KX-One could have hooked up a little better.

TURN-IN



The stock setup provided excellent turn-in, but the one-way front diff made the car loose.

CORNER SPEED



The one-way allowed the KX to maintain high corner speeds in the sweeping sections of the track.

TRANSITIONAL HANDLING



Any car with a one-way requires more attention on tight switchback turns. The KX requires extra throttle control in these sections.

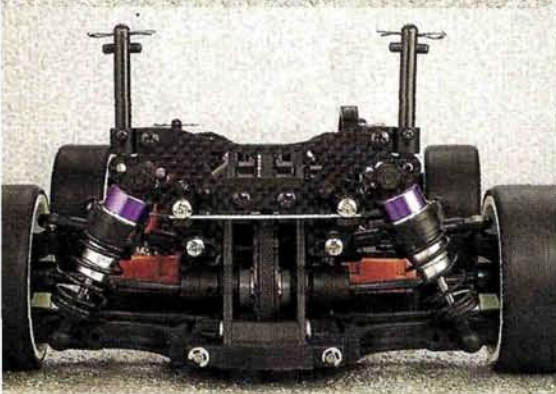
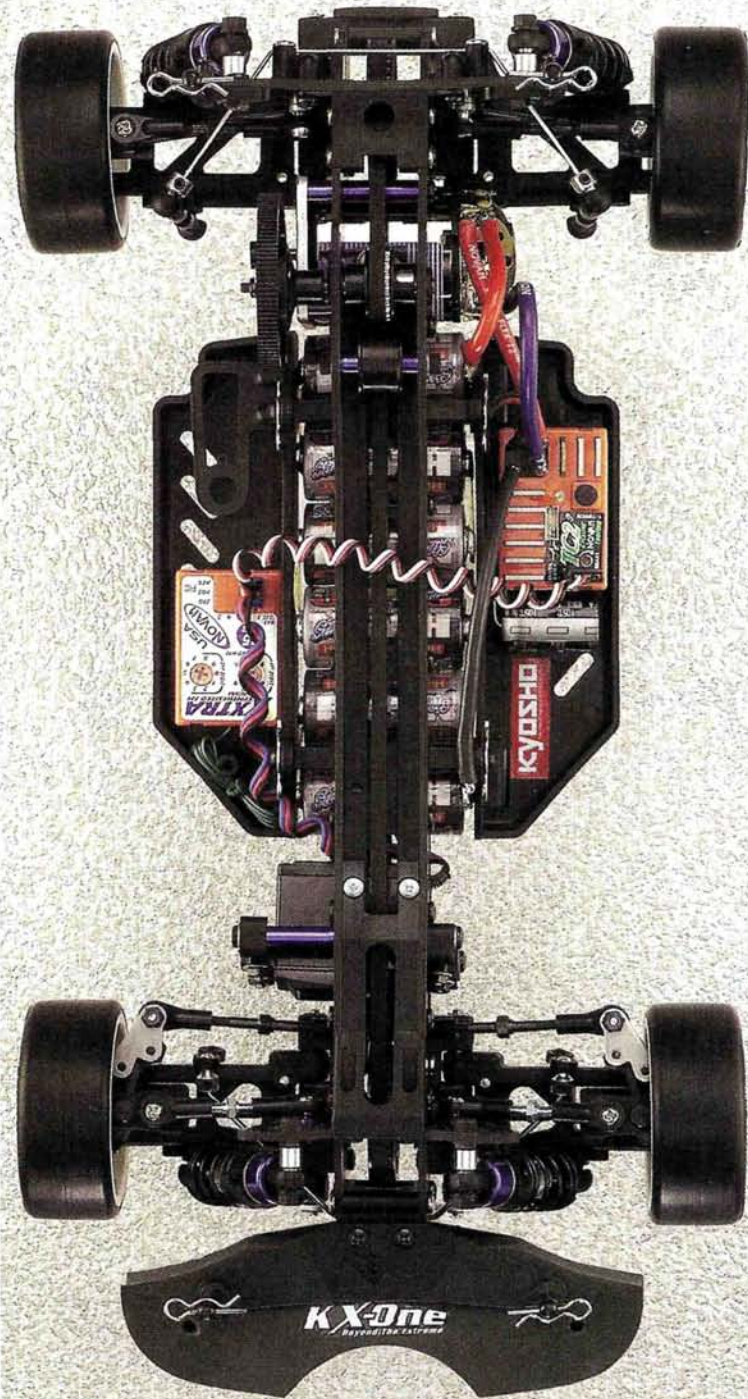
BONUS

- Single-belt/front one-way setup delivers blistering acceleration and high corner speeds.
- Includes swaybars.
- Super-rigid chassis.

BOGUS

- Side-by-side cells float up and down in chassis.
- Expensive.
- No full-time 4WD option without optional parts.

KYOSHO: distributed by Great Planes Model Distributors, P.O. Box 9021, Champaign, IL 61826-9021; (800) 682-8948; www.kyosho.com.



Clip-on spacers adjust the spring preload of the KX-One's variable-damping, floating-piston shocks.



Adapter plates reconfigure the steering hubs from the bellcrank-equipped TF-4 for use with the KX-One's direct-link setup.



Three positions are available for rear axle height relative to the suspension arm. Note the opening in the chassis for the motor and its proximity to the rear diff.



OFNA OB-4 International

Associated's TC3 is available as an RTR, as is a budget version of the Academy STR-4, but OFNA's OB-4 International is offered as an RTR only. We removed the supplied Airtronics Rival radio gear, M-troniks reversing ESC and 540 motor for testing. Given the OB-4's pricing versus its specs, the electronic gear is essentially "free." And you do get a lot of car, complete with aluminum bulkheads, pivot-ball suspension and full graphite.

AT A GLANCE

Street price \$325
Battery configuration Saddle pack
Drive-train type Dual belt
Weight, as tested 44.34 oz.
Fastest lap (sec.) 18.8

FEATURES

- Sold RTR with 540 motor, M-tronix ESC and Airtronics Blazer radio system (not shown).
- Graphite chassis plates and shock towers.
- Lightweight plastic outdrives.
- Threaded-aluminum shock bodies.
- Machined-aluminum bulkheads.

READY TO RUN

PERFORMANCE

ACCELERATION

The OB-4's lightweight drive train provided very good acceleration.

TURN-IN

The OB-4's stock setup fared well but had a slight push when entering turns.

CORNER SPEED

Although slightly slower than the one-way cars, the OB-4 held its own through the turns.

TRANSITIONAL HANDLING

Due to its somewhat soft stock setup, the OB-4 wasn't as fast as some of the other cars, but it turned consistent laps.

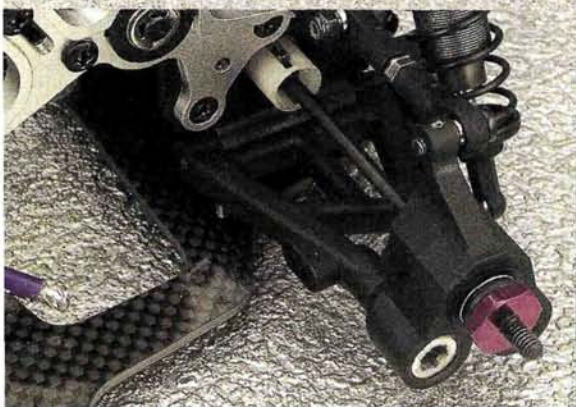
BONUS

- Fully assembled.
- Lightweight Delrin diffs.
- Includes Andy's Stratus body and raceworthy tires.

BOGUS

- Included battery tray is for stick packs only; saddles must be taped in.
- Pivot-ball hubs get sloppy quickly; needs frequent readjustment.

OFNA RACING, 22692 Granite Way, Ste. B, Laguna Hills, CA 92653; (949) 586-2910; www.ofna.com



Pivot ball/camber link suspension with adjustable droop and Delrin outdrives show the OB-4 International is built to race.



Removable clips adjust front caster, and servo-saver tension is adjustable.

Good-looking graphite, aluminum bulkheads and an aluminum spur-gear squish plate are all standard.



Schumacher Axis 2

Schumacher may have its new Mission sedan available by press time, but for now, the Axis 2 remains the premier car in the line. Not that it needs replacing; the Axis 2 currently holds a bunch of national titles and is fully equipped with everything you need to go fast. The laminated, S1-composite chassis is the most unique feature; combined with the mid-motor layout and skewed dual-belt drive, the Axis 2 is as unique as it is functional.

AT A GLANCE

Street price \$219

Battery configuration Saddle pack

Drive-train type Dual belt

Weight, as tested, 45.57 oz.

Fastest lap (sec.) 17.1

FEATURES

- Full-time 4WD.
- Lightweight-plastic, CVD-style axles.
- Unique, dual-layer chassis.
- Pre-assembled diffs and upper camber links.
- Aluminum shock bodies.
- Adjustable pistons.
- Angled drive train keeps diffs in center of the chassis.

PERFORMANCE

ACCELERATION



The Axis 2's angled drive train puts the diffs in the center of the chassis for straight launches, but some wheelspin was evident.

TURN-IN



The Axis 2 was designed for the blacktop and provided lots of usable steering.

CORNER SPEED



Full-time 4WD usually makes for on-power push, but the Axis was able to keep a good amount of corner speed.

TRANSITIONAL HANDLING



The stock setup was loose but controllable, thanks to the front diff and well-balanced chassis.

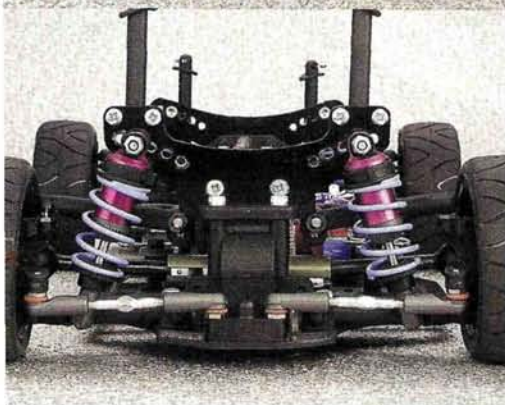
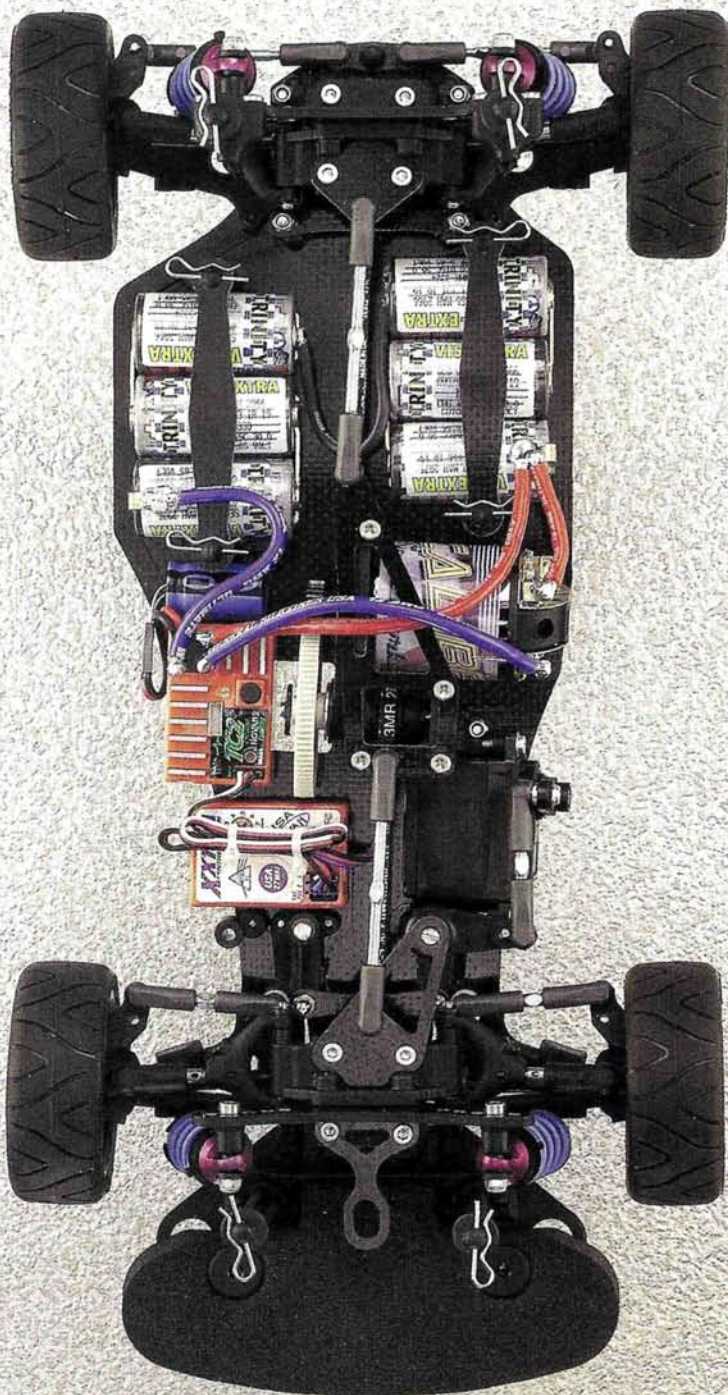
BONUS

- Pre-assembled diffs and links reduce time to track.
- Heavy-duty "titanium-style" steel turnbuckles.
- Ultra adjustable.

BOGUS

- Plastic motor mount doesn't dissipate heat; could be flexy.
- Adapter required for use with standard spurs.

SCHUMACHER USA, 6302 Benjamin Rd., Ste. 404, Tampa, FL 33634; (813) 889-9691; www.racing-cars.com.



Hard-coated aluminum outdrives and padded "Blade" dogbones on plastic CVD-style universal axles are Axis 2 hallmarks.



Shortish arms are joined with deeply offset steering hubs to bring the Axis up to a full 190mm width.



The top deck isn't missing; the Axis 2 simply doesn't have one! The turnbuckles look titanium but are actually steel.



Tamiya TB Evolution

The TB Evo was hand-picked by Tamiya to represent the company in this test, and it represents the pinnacle of Tamiya touring performance. The car makes good use of drive train parts seen previously in Tamiya's nitro car lineup, and no options have been spared in the quest to build a truly race-ready car. The result is an exceptionally well-finished and competitive car, but performance comes at a price, and the TB Evolution is the most expensive car tested.

AT A GLANCE

Street price \$419
Battery configuration Stick/
 side-by-side pack
Drive-train type Shaft drive
Weight, as tested 47.3 oz.
Fastest lap (sec.) 18.4

FEATURES

- Graphite chassis plates, shock towers and battery hold-down.
- Threaded-body "Low Friction" shocks with Teflon pistons and shaft guides.
- Tamiya Type-A belted slicks.
- Front one-way diff, rear ball diff.
- Aluminum drive shaft.
- Metric spur gears and aluminum pinion included.
- Machined-aluminum motor mount.
- Front and rear universal-joint axles.

PERFORMANCE

ACCELERATION

Shaft drive and probably the freest drive train of the bunch gave the Evo good acceleration with slight torque steer.



TURN-IN

The Evo had a very balanced stock setup and provided a respectable amount of steering.



CORNER SPEED

The Evo was slightly slower through high-speed corners, despite its front one-way diff.



TRANSITIONAL HANDLING

The Evo was easy to drive through the twisty sections and felt consistent.



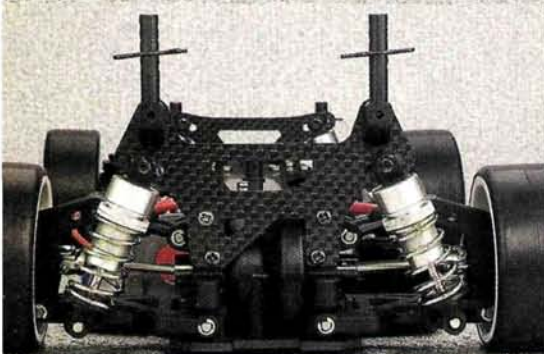
BONUS

- Shaft drive is impervious to dirt, grit, carpet dust, etc.
- Includes spare spur gears.
- Excellent shocks.

BOGUS

- Poor access to motor screws makes gear-mesh adjustment difficult.
- Most expensive car tested.
- No full-time 4WD option without optional parts.

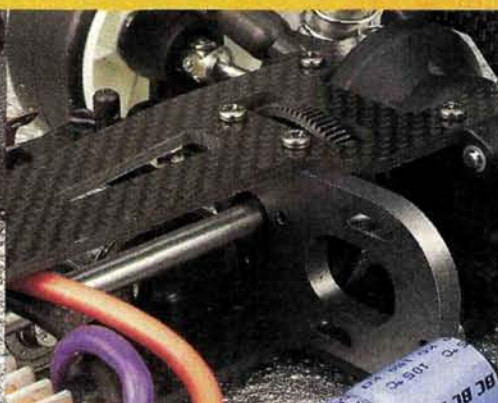
TAMIYA AMERICA INC., 2 Orion, Aliso Viejo, CA 92656-4200; (800) TAMIYA-A; www.tamiya.com.



Threaded Low Friction shocks are standard. Two-piece preload collars are used to hold adjustments.



The TB Evo's axles are splined to accept aluminum hexes—no crosspins required.



The aluminum motor plate/spur gear support is trick, but motor screw access is poor. A ball-end hex driver helps.

GREG'S PICK



Team Losi Triple-XS

The Street Weapon follow-up represents Losi's clean-sheet vision of touring performance, and that vision is much broader than single-belt drive. The core of the car is its Stiffezel chassis, which integrates as much of the car's structure into a single molded part as possible. This was done in an effort to produce a car that would not take a tweak, and based on our experience, the result is an exceptionally consistent and easy-handling ride.

AT A GLANCE

Street price \$220
Battery configuration Stick pack
Drive-train type Single belt
Weight, as tested 47.09 oz.
Fastest lap (sec.) 17.3

BEST OVERALL

WHY IT WON It tied with the Yokomo MR4-SE in performance, but the Losi's lower price, wide availability and parts support, forgiving handling, and easy setup make it our "Best Overall" pick.

FEATURES

- Plastic composite chassis with integral belt tunnel and diff bulkheads.
- Single-belt drive train with adjustable tension.
- Hard Body bottom-loaded aluminum shocks.
- Genuine steel MIP CVD axles
- Steel turnbuckles.
- Enclosed drive train.
- Diffs centered in chassis.
- Externally adjustable diffs.
- Extra pulley included for over-/under-drive.
- Includes optional anti-dive and anti-squat arm mounts

PERFORMANCE

ACCELERATION

The single-belt design and lightweight drive components made for straight launches and excellent zoot out of corners



TURN-IN

The stock setup provided just the right amount of oversteer to allow you to put the Triple-XS anywhere you wanted.



CORNER SPEED

Like other cars with full-time 4WD, the Triple-XS scrubbed a little speed on power.



TRANSITIONAL HANDLING

The well-balanced feel and dual diffs made the Triple-XS very fast through the twisty sections of the track.



BONUS

- Enclosed, free-running, single-belt drive train.
- Easiest-to-drive box-stock setup.
- Includes 41-tooth diff pulley for under-/over-drive setup.
- Externally adjustable diffs

BOGUS

- Doesn't accept standard spurs without optional adapter.
- Belt skips when braking.

TEAM LOSI; distributed by Horizon Hobby Inc., 4105 Fieldstone Rd., Champaign, IL 61822; (217) 355-9511; www.horizonhobby.com.



The motor is mounted on a cam plate for mesh adjustments.



Capped suspension arms and combined kingpin/ball studs deliver exceptional handling.



The bellcrank's unusual geometry works and provides necessary clearance for the central belt tunnel. Note the thick bulkhead that fits into a tight recess in the shock tower; these parts won't budge.



XRAY T1

XRAY is a newcomer to the scene but has quickly established itself as a quality- and performance-first manufacturer with the debut of the T1. XRAY spared no expense in providing the T1 with the very best components, from Hudy-manufactured spring-steel driveline parts to hard-coated aluminum bulkheads and Serpent-supplied externally adjustable shocks. The T1 is also highly adjustable as well as easily adjustable, making it more likely that you will find the right setup for the conditions at hand.

PETE'S PICK

AT A GLANCE

Street price \$325
Battery configuration Saddle pack
Drive-train type Dual belt
Weight, as tested 44.76 oz.
Fastest lap (sec.) 17.5

FEATURES

- Graphite chassis plates, battery straps and shock towers.
- Hard-coated, machined-aluminum bulkheads.
- Spring-steel drive axles, turnbuckles and hollow layshaft.
- Integral aluminum spur-gear mount.
- Pivot-ball suspension.
- Adjustable front one-way pulley.
- Kimbrough spur gear and hard-coated aluminum pinion included.
- Plastic, threaded-body shocks with externally adjustable damping.

BEST CRAFTSMANSHIP

PERFORMANCE

ACCELERATION

The T1 launched straight and accelerated strongly out of the corners.



TURN-IN

The stock setup provided a good balance between a forgiving push and a faster, looser car.



CORNER SPEED

An adjustable one-way pulley made it easy to dial in the XRAY for its best corner speed.



TRANSITIONAL HANDLING

The T1 was very stable through the twisty sections and had good rotation in the turns with out scrubbing too much speed.



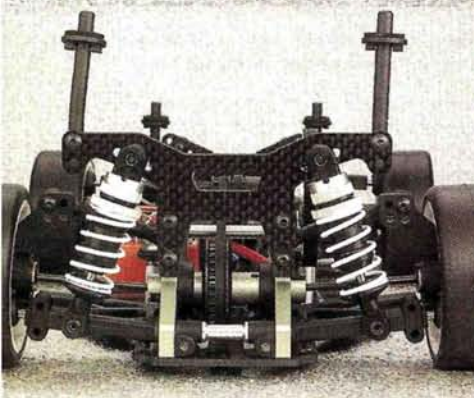
BONUS

- Best-crafted car of the bunch; excellent materials.
- Completely and easily adjustable.
- Available with front diff and front one-way in one kit.
- Adjustable one-way pulley.
- Externally adjustable diffs, shocks.
- Includes full-color setup book.

BOGUS

- No belt tensioner.

XRAY MODEL RACING CARS; distributed by Serpent Inc. USA, West Park Center, 2830 NW 79th Ave., Miami, FL 33122; (305) 639-9665; www.hudy.net; info@serpent-usa.com.



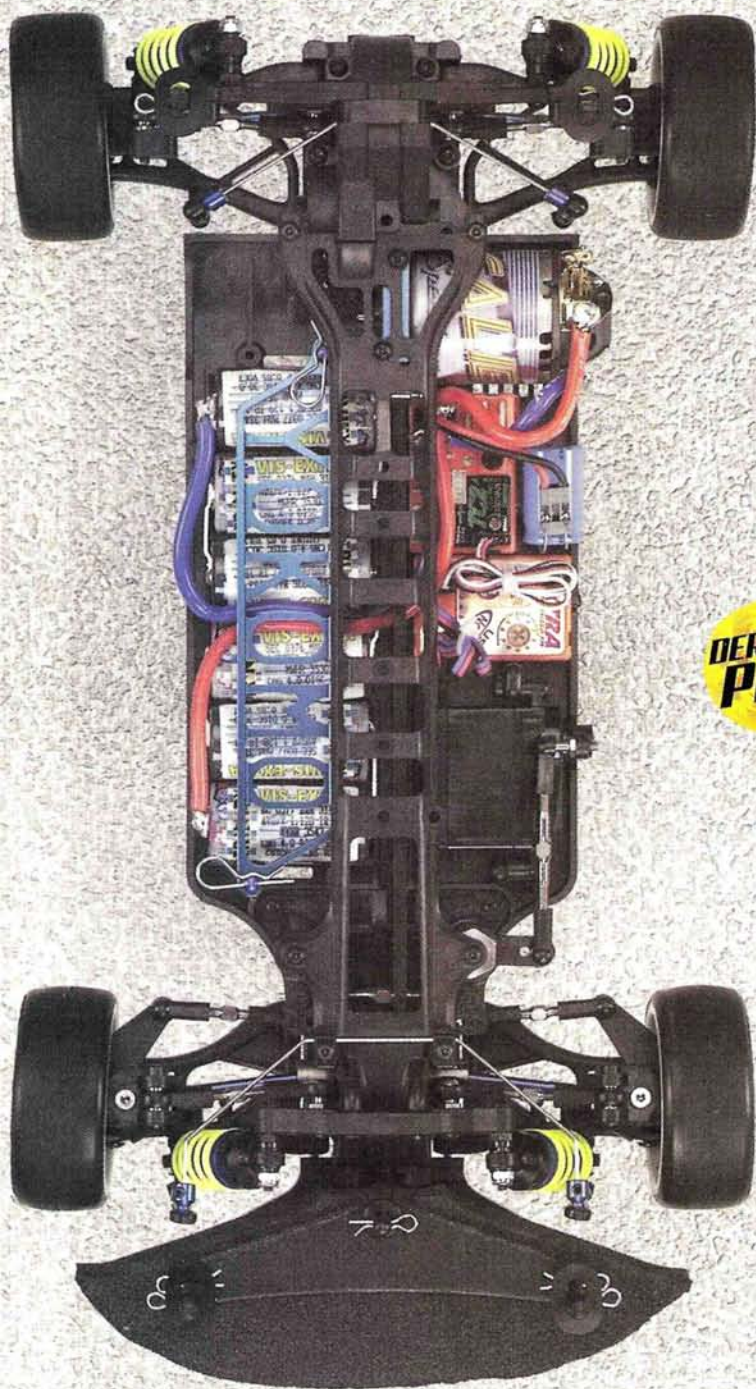
Threaded-body Serpent shocks equip the T1 and feature externally adjustable damping.



The T1's pivot-ball hubs are purpose-built for 1/10 TC racing and fit within all popular sedan wheels.



Hard-coated Duraluminum bulkheads, gleaming graphite, and a genuine Kimbrough gear speak to the quality of the T1.



Yokomo MR-4 Pro Special Edition

Yokomo has a long tradition of competitive touring platforms that dates back to the YR-4—RC's first true race-ready sedan. A lot has changed since that protean tourer, and the MR-4 Pro Special Edition (SE) is as cutting-edge as 2-belt technology gets. A new, slim-line chassis, a generous helping of aluminum upgrade parts and a torque-splitter one-way setup make this the ultimate MR-4 and Masami Hirotsuka's best chance at the next IFMAR world title.

AT A GLANCE

Street price \$299
Battery configuration Side-by-side/stick pack
Drive-train type Dual belt
Weight, as tested 45.68 oz.
Fastest lap (sec.) 17.5

DEREK'S PICK

FEATURES

- New narrow chassis.
- Full ball bearing.
- One-way front diff and top shaft.
- Lightweight aluminum CVDs.
- F-1 style chassis.
- Titanium turnbuckles.
- Front and rear swaybars.
- Aluminum motor mount.
- Aluminum battery brace.
- Lightweight plastic rear outdrives.
- Lightweight aluminum front outdrives.
- Aluminum threaded body shocks.

PERFORMANCE

ACCELERATION



The Special accelerated strongly out of the corners and felt very sure-footed under heavy throttle.

TURN-IN



This was one of the most balanced feeling cars right out of the box. Even with the one-way, the SE was very easy to drive.

CORNER SPEED



The SE uses a front one-way and one-way pulley that allow maximum cornering speed in the high-speed sweeper.

TRANSITIONAL HANDLING



Fast drivers will appreciate the double one-way setup, and if you stay on the gas, the car is rock-solid.

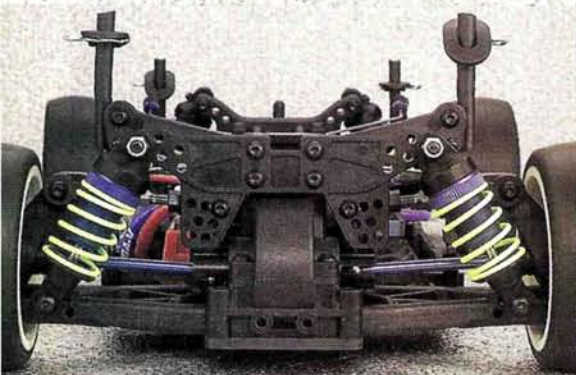
BONUS

- Fully loaded with graphite, titanium and aluminum.
- Hooked-up right out of box
- Cool F1-style "ground effects" chassis

BOGUS

- Very limited space for electronics.
- Aluminum battery brace is cool, but its proximity to the pack's solder tabs makes it easy to short the pack.
- No full-time 4WD option without optional parts.

YOKOMO USA, Airport Business Center, 17951 Skypark Cir., Ste. K, Irvine, CA 92614; (949) 252-8663; www.yokomousa.com.



Finely threaded aluminum shocks make for precise preload adjustments.

Note the screw that captures the hinge pin in the capped suspension arm and the sweet, pinch-style hex hub.

The Yoke's spur gear is buried in the rear of the car and is held very low to keep the CG as close to the ground as possible. ■

by Greg Vogel & Derek Buono

Associated and Losi pull out of Worlds

Add the upcoming Electric Off-Road Worlds in South Africa to the list of events touched by the terror attacks on the United States. Both Team Associated and Team Losi have decided that the safety of their drivers is of greater importance than any trophy. Here are the official announcements from both teams.

TEAM LOSI

"We have serious doubts about the safety of attending the World championships in South Africa. After checking with our racers and waiting to see what the 'world situation' would be, we have decided not to attend. This has been a sad and tragic time in the history of the free world. Like so many other international competitions, both professional and amateur, that have opted to cancel or postpone their events for the safety of their competitors, we feel compelled to do the same."

TEAM ASSOCIATED

"In light of the recent tragic events here in the USA, and with the current instability and uncertainty as to future terrorist actions, we at Team Associated have notified IFMAR that we regretfully withdraw our drivers from the 2001 IFMAR Off-Road World Championships.

"We do not like to bend to the weight of terrorist actions, but we will not compromise the safety and well-being of our Team. We sincerely hope that other manufacturers will follow our lead due to these safety concerns and out of respect for the many who have suffered in the tragedy of the past week."



BEER, INDY CARS AND RC

Canada is famous for a couple of reasons—bacon and ... ummm ... well, Canada just got a whole lot more interesting as the Molson Indy Racing series came to town. During the event, spectators were treated to some live RC racing. Here's a race report submitted by the guys at Magma International:

"With close to 75,000 spectators attending the 16th Annual Molson Indy grand racing event, Molson Brewery was again proud to support Toronto's 3rd Annual Molson Indy R/C Challenge. Needless to say, thousands of spectators witnessing RC racing were quite a spectacular scene.

"All attention was drawn to Day 2. The track measured 145x45 feet, with a concrete racing surface that has been a big challenge for drivers, year after year. As only rubber tires are allowed (per IFMAR rule), we saw some awesome driving skills. Racing in an air-conditioned, spacious, well-lit indoor convention hall meant drivers were all pumped to deliver their peak performance."

Indy cars and RC? Sounds like fun; maybe *Radio Control Car Action* will be there next year.

GS Storm Service Notice

The Storm we recently tested held up fine, but GS Racing has issued this service notice on the car. Storm racers, listen up:

"Since the release of the GS Storm (ARR and RTR) in May 2001, we have discovered that some of the differential bevel gears are wearing prematurely. To correct this situation, GS will be supplying 'GS Storm Care Packages' that will contain newly redesigned parts for the differential. This will include differential gears, differential gaskets, gear shims and differential joint cups. Although we have found that only the front and rear differentials have worn prematurely, GS will provide parts to correct all three differentials. If you have experienced problems with your differential gears wearing out prematurely or have any further questions, please contact Horizon Product Support at (877) 504-0233. Horizon will request either the return of your old differential gears and differential joint cups or proof of purchase and a printed store receipt."

SITE SEEING



HTTP://WWW.OCTMC.COM/ROCKETMAXX.HTM

This site makes us laugh every time we watch the Rocket Maxx in action. That's right; you get to see what happens when you cross a T-Maxx with model rocket engines. It's worth the lengthy download. Classic line from the video: "You officially suck!" Check it out.

SPEED SHOP



Putnam Propulsion charger skins

Putnam Propulsion offers faceplates for the T30 and T35 chargers. They are available in a variety of colors and styles to add a personal touch to your charger. They include simple instructions on how to replace the face of the charger. Custom graphics are available for a personal touch.

Putnam Propulsion, P.O. Box 179, Nassau, NY 12123; (518) 527-8439; www.putnampropulsion.com.

Charger skins—part numbers vary, \$15.95.

Hardcore Racing aluminum TC3 drive cups

Hardcore adds to its list of TC3 accessories with this pair of machined-aluminum drive cups for the Associated touring car. Designed to be light-weight and long wearing, the cups look great and help keep rotating mass to a minimum.

Hardcore Racing Concepts, 25435 Rye Canyon Rd., Valencia, CA 91355; (661) 294-5032; www.racinghardcore.com.



Aluminum output drive cups—HCR-00239, \$21.

New Era servo and receiver guard

A while back, we featured a "Hot Mod how to" on building a receiver protector for an RC-10 GT. Those of you who don't have time to make your own can pick up a servo and receiver guard (or "SRG," as New Era calls it). The SRG throttle/receiver guard is machined from thick, 3.2mm T6 aluminum and has several holes drilled in it to reduce the weight to only 0.8 ounce. The guard bolts on to the RC-10 GT RTR and Factory Team trucks with the supplied fasteners and is available in silver or blue anodizing.

New Era Models, P.O. Box 7378, Nashua, NH 03060-7378; (603) 888-4453; www.neweramodells.com.

RC10GT servo and receiver guard—AGT345SD, \$16.95.



Trinity Brush Warehouse

Ever dream of becoming a motor-tuning god like Jim Dieter? Do you own a hobby shop and need a full line of brushes and springs? Trinity's motor-tuning kit is the ultimate in motor-tuning aids. It includes 10 pairs (120) of brushes in six compounds and 10 pairs (120) of springs in six tensions. That means if you need to tune your motor for any application, the right combination is in this box.

Trinity Products Inc., 36 Meridian Rd., Edison, NJ 08820; (732) 635-1600; www.teamtrinity.com.

Trinity Brush Warehouse—RC 4090, \$249.



HPI ball diff for Nitro Rush

The Rush has a number of racing accessories to help you go from "regular" to "race-ready" in a hurry. If you've ever noticed slop in the differential, this should help. The ball diff replaces the stock gear diff with a smooth ball differential. It features carbide balls and aluminum outdrives for long life.

HPI Racing, 15321 Barranca Pky., Irvine, CA 92618; (949) 753-1099; www.hpiracing.com.

Ball diff set—72185, \$48.

TRACK THREADS

Trinity Nitro cap

Trinity jumped into nitro with a full head of steam. Its new Nitro hat features a Flexfit band to fit all needs, and an embroidered Trinity Nitro logo on the front.

Trinity Nitro cap—RC9792 (S/M), RC9793 (L/XL), \$17.99.



Three Hours of Tamiya

by George M. Gonzalez

Electric touring-car Enduro

The most appealing aspects of nitro TC racing—other than the sound, smell and speed—are the super-long main events with mandatory fuel stops, just like in full-scale racing. The staff at Tamiya America must have asked, “Why do nitro racers get to have all the fun?” when they organized the “3 Hours of Tamiya” endurance race for electric Tamiya sedans. This is not a misprint, folks; we’re talking 3 hours of racing with an electric touring car.

Held at Tamiya’s beautiful permanent racetrack in Southern California (at which the TCS Nationals were scheduled for the following weekend), 14 different teams attended, each with a pit bag full of the battery packs, tires and replacement parts that were necessary to complete more than 500 laps around the technical roadcourse. Sound interesting? Here’s how the event went down.

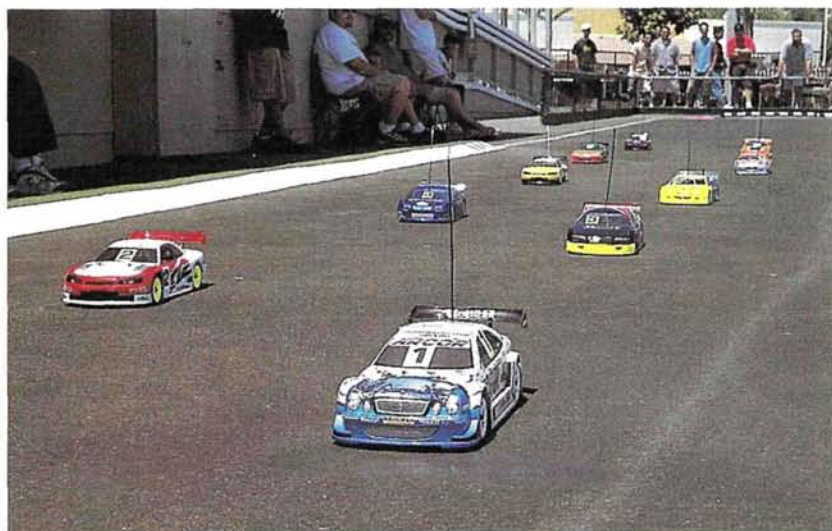
THE RULES

Each team was allowed to have as many as four members, although most got by with only three. It was up to each team to decide who would drive and who would pit. With 3 hours of racing, however, most of the teams alternated drivers so each member received ample wheel time. Before the main event, the teams competed in a speed-trial/qualifying system in which each of the team’s fastest single lap times determined the grid order. Each team received 5 minutes of open track time and was allowed to pull over to make adjustments that would enable them to put in the fastest possible single lap time. As expected, each team brought along a “ringer” who was capable of setting the track on fire for 5 minutes.

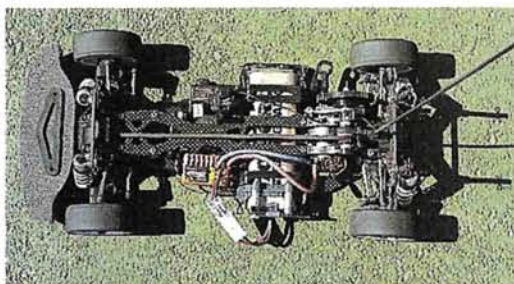
The teams with the top 10 fastest lap times qualified for the 3-hour A-main. Actually, the starting grid was only a formality because it didn’t really matter where the drivers started; after all, they had 3 hours to find the fastest line around the track. Only Tamiya electric touring-car models were allowed to compete, but that didn’t stop teams from HPI, Yokomo, Novak and Nitro House/OFNA from competing. Heck, even Jack Johnson and Ron Rossetti showed up to compete.

THE WEAPONS

By far the most popular car at the event was the TA04 Pro, although I spotted a few TB01 and TA03 chassis cars, as well. The most popular body was Tamiya’s 360 Ferrari. The



Here’s Team TRF’s Enduro-winning TA04. This is just an everyday TA04, except for the quick-change battery mechanism. These guys even used sport battery packs.



Tamiya Calsonic Skyline was also popular, as was the Corvette C-5. Tamiya’s B Compound Reinforced Slicks were the hot ticket, and the teams that used these particular tires needed only one set to complete the 3-hour race; amazing! Most teams used garden-variety machine-wound modified motors, and the winning team—Team TRF—primarily used Tamiya 1700mAh sport packs! Of course, they cycled more than 30 battery packs during the course of the race.

THE RACE

You might think that there would be a lot of position changes in a half-day-long race, but one team dominated the entire time. David Jun and Randy Flores from Team TRF took the lead from the very start, only to lose it temporarily during the first pit stop. After 10 laps, Team TRF regained the lead and never gave it up again.

After 591 laps and more than 30 pit stops, Team TRF was declared champion of the “3 Hours of Tamiya.” Team Tamiya/Nitro House came in second after completing 575 laps. With 551 laps, Team In the Pits finished third. In grand Tamiya fashion, the finalists were awarded a wide array of cool prizes, including TA04-S kits. ■

WINNERS

QUAL/FIN	TEAM NAME	CHASSIS	LAPS	DRIVERS
1/1	Team TRF	TA04	591	David Jun and Randy Flores
2/2	Team Tamiya/Nitro House	TA04	575	Jenni Bump, Fred Medel, Gary Demory and Tim Bump
3/8	Team In the Pits	TA04	551	Joey Bestor, Arnel Binoya, Tony McMillen and Daniel McMillen
4/6	Team Cold Turkey	TA04	548	David Beale, John Houda and Frank Servas
5/4	Team Booty 2	TRF 414X	545	Paul Dabao, Joey Orlanes and Carl Fetro
6/3	Team Chicken Run	TB01	533	Ron Rossetti, Jack Johnson and Mark Dawson
7/5	Team Hobby Town Fresno	TRF 414X	531	Justin Morgan, Jim Bishop and John Toews
8/7	Team HPI	TA04	501	Thad Garner, Eric Shauver and Woichi Matsuda
9/10	Team Unprepared	TA04	453	Anthony Tuason, Jamison Bastians and Tony Tuason
10/9	Team Da Flyin’ Penguins	TBEV	374	Charley Barnes, Brian Sohn and Angela Grodell

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KYOSHO
THE FINEST RADIO CONTROL MODELS

5 QUESTIONS

Age: 23

Last big win: Trinity Road Course Challenge 2000

Favorite track: CRC Raceway, Rome, NY

Sponsors: Associated, Reedy, LRP, Protoform, Pro-Line, IRS, Raceway Mfg., Kimbrough, Jaco, Thunderwings

Last big win: 2001 Trinity Snowbird Nationals

When I'm not racing: I hit the gym and then the clubs.



Daryl Silva

RCCA: When you beat your brother at the track, does he take it off the track and open a can of whup-ass on you?

Daryl Silva: He tries, but it never happens. He just has to take the beating on and off the track.

RCCA: What are your favorite CDs?

DS: Right now I'm spinning Linkin Park, Sum 41, Limp Bizkit and Blink 182.

RCCA: What did you dream of being when you were little? Did you ever think that you would end up in the RC industry?

DS: I always dreamt of being a real race-car driver; I think it's probably every RC'er's dream to do that. It was one of those weird chain-of-events things that led me to this great industry.

RCCA: To what do you attribute the decline in oval's popularity?

DS: The speed and the tires. These cars go fast, and tires play a big role in going really fast. It doesn't help that battery technology seems to follow the computer industry in that newer, faster cells are coming out too often.

RCCA: Do you own a T-Maxx?

DS: Not yet, but when I get one, I'm gonna convert it to an LTO.

UNDER THE HOOD

DARYL SILVA'S **SNOWBIRD-WINNING**
ASSOCIATED RC10 L30



Daryl runs a slammed Protoform Pontiac Grand Prix body with his signature paint scheme.

EQUIPMENT

RADIO SYSTEM: JR R-1
STEERING SERVO: Hitec HS225MG
ESC: LRP Quantum
MOTOR: Reedy Ti
GEARING (pinion/spur): 31/120
TIRES (F/R): Jaco
BODY: Protoform Pontiac



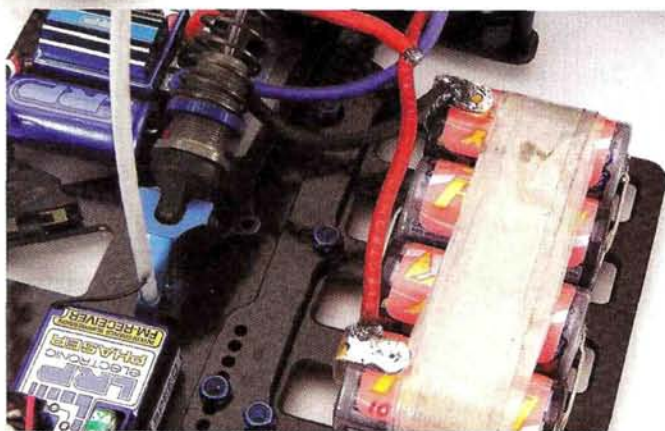
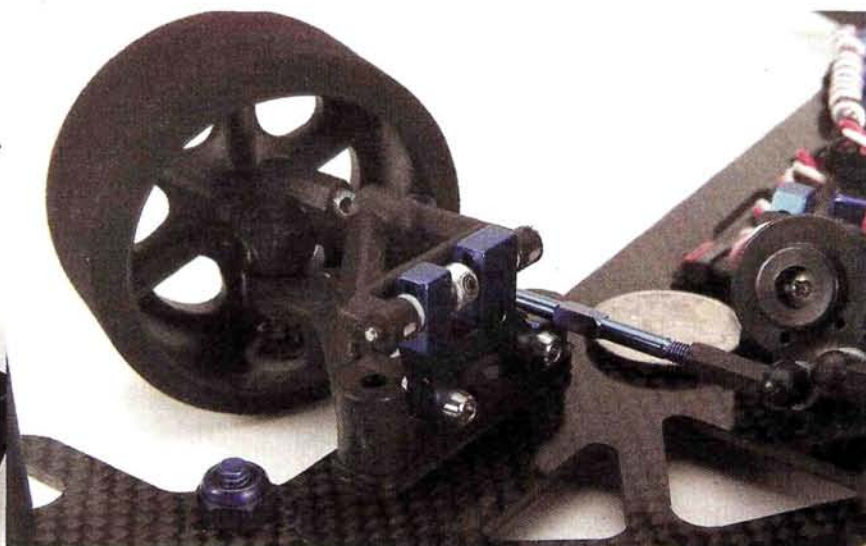
Under the body, the Associated 10L30 is simple yet complicated. Three shocks control the rear pod; the 50 cents is not for extra weight but is just in case Daryl needs a soda while racing.



FACTORY DRIVER HOT MOD

The stock T-bar has been replaced by a TRC spring steel T-bar. It keeps its shape better and helps the rear end snap level more quickly for rapid acceleration out of the corners.

Here's a good shot of the Raceway Mfg. front end that changes the roll center of the car for improved cornering.



The L30's battery position is completely adjustable to fine-tune weight distribution depending on track conditions. To get every bit of power from the main 4-cell pack, most drivers use a small receiver pack.

SOURCE GUIDE

HITEC RCD INC.
12115 Paine St., Poway, CA 92064; (858) 748-6948;
www.hitecrad.com.

IRRGANG RACING SERVICE (IRS)
18 Cannon Rd., Milmay, NJ 08340;
phone/fax (609) 476-2371.

JACO
Distributed by Pro-Line/Jaco.

JR RACING
Distributed by Horizon Hobby Inc., 4105 Fieldstone
Rd., Champaign, IL 61821; (217) 355-9511;
www.horizonhobby.com.

LRP
Distributed by Team Associated.

PRO-LINE
P.O. Box 456, Beaumont, CA 92223; (909) 849-9781;
www.pro-lineracing.com.

PROTOFORM INC.
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REEDY
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TEAM ASSOCIATED
3585 Cadillac Ave., Costa Mesa, CA 92626;
(714) 850-9342; www.teamassociated.com.

TRC
36 Meridian Rd., Edison, NJ 08820; (732) 635-1600;
www.teamtrinity.com.

LAST LAP

Have you ever cheated during a race, either accidentally or on purpose?

Yeah, in my third race ever. I was racing on carpet in the 2WD stock truck class with my Rustler, and I really sucked. So in my third week of racing, I switched the armature in my P2K Pro to a Chameleon Pro and ended up getting second place out of six cars. My teammates made me turn myself in, and I ended up getting suspended from the next event. Ironically, I now race spec mod touring with my Chameleon Pro!

Jon Schuster

How dare you! That's an untrue accusation! I mean ... umm ... No, I have never cheated—yet—and I don't plan to—yet.

Adrian (StrangeDesires) McEachen

If you consider it cheating when the marshal accidentally kicks my car, then throws it over the next wall into the same position as I was in before I crashed, then I'm a filthy cheater!

James Pradun

No way! Cheating is bad; if you want to win a race, win honestly! If you cheat, you have no business racing!

Scott Cahan

Uhh ... no comment.

Jason Pearson

If I even thought about cheating, my nose would start to grow. I would look like Pinocchio before the Main.

Geoff Rice

NEXT MONTH'S QUESTION

Winning a gas race can come down to pit strategy. When you pit, do you pit with the rest of the pack, or early or late? Explain your strategy.

Respond by clicking "Last Lap" at www.rcracing.com, or email your responses to gregv@airage.com.

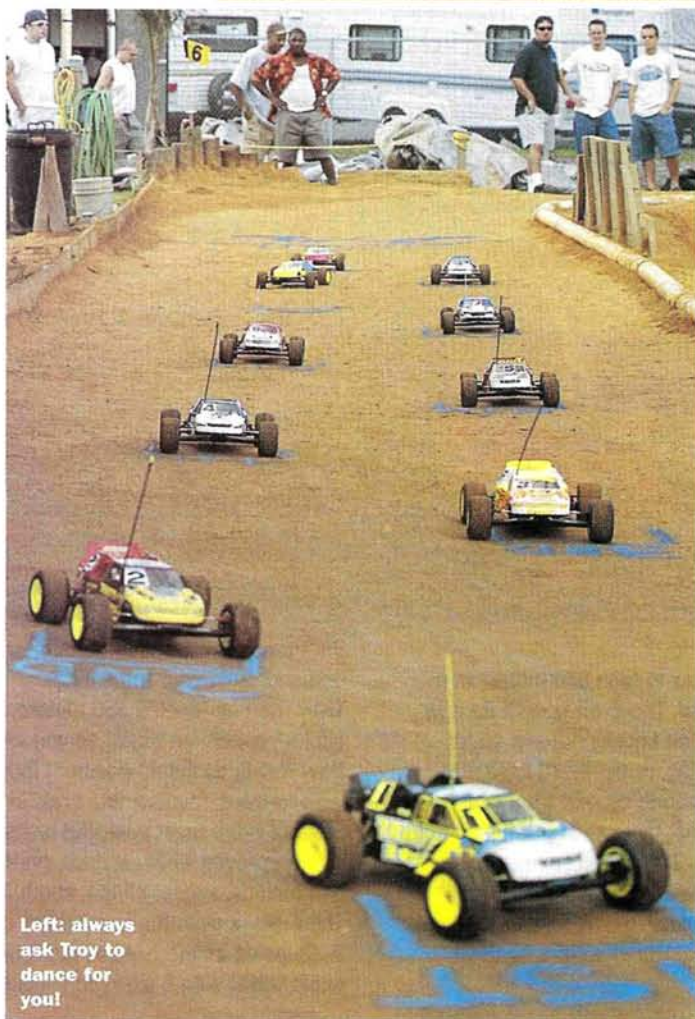
2002

ROAR 1/10 ELECTRIC OFF-ROAD MOD NATIONALS

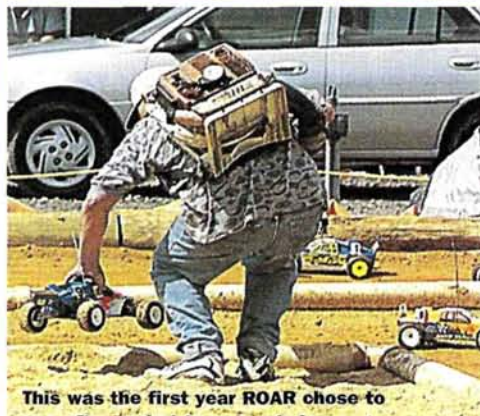
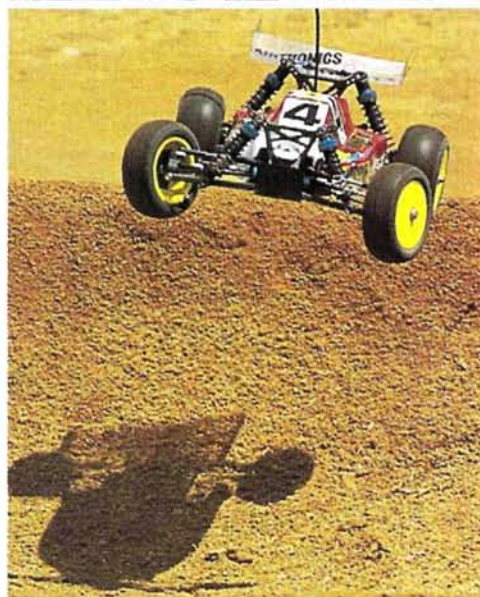
BY DEREK BUONO

Every pro driver dreams of winning a national championship. This year's race was every bit as intense as previous national competitions; every driver had it in mind that the Worlds were just around the corner. The Florida weather tried like mad to spoil the event, but to the hardest-working track crew in the States, three inches of rain an hour was nothing. The intensity of the rain matched that of the race, as the nation's best drivers gathered at the Minnreg Club in St. Petersburg, FL, for the chance to win big.

Losi and Trinity,
Francis and Kinwald
—unbeatable



Left: always ask Troy to dance for you!



This was the first year ROAR chose to use aftermarket turn marshals.





SPONSORS: TEAM ASSOCIATED * TEAM LOSI * REEDY * SUPERIOR HOBBIES * RC CAR ACTION



Our favorite squirrel felt ill most of the week. Oddly enough, his roommate, Mark Pavidis, had the same illness.

QUALIFYING

Qualifying was tough. Not only was it a race against the clock, but it was also a race against the rain. If a full round of qualifying wasn't completed, it would have to be scratched. This happened during the last heat of qualifying. Lightning was dangerously close by, so the last round had to be bumped. Weather aside, Kinwald was on

fire! He was at the top of the top-10 list in every class. Matt Francis put his Trinity-powered Losi on BK's heels in every class, and Brian Dunbar did the same with his Phantom-powered Losi. With qualifying so close, the Mains were sure to be exciting.

• **Mod truck, A1.** Kinwald maintained his lead with the first A-main holeshot of the Nats. Francis, Dunbar and Pavidis followed Kinwald across the timing loop for the first lap, separated only by tenths of a second. Matt and Brian tangled and allowed Pavidis to take the lead. Kinwald lost some mojo after the tangle and quickly fell behind by several positions. Billy Easton and Jason Ruona followed Francis and Pavidis. With less than a minute to go, the battle heated up as Pavidis was looking for



Above left: Matt Francis was all smiles after winning two Nationals. Far left: what's a race without a trophy? You choose which is the trophy. Left: the legendary Kinwald took all the TQs. Below: the hardest-working track crew in the country.



Brian Kinwald's winning Trinity-powered Losi Triple-X.

the first win. A tangle in the last turn allowed Francis to take the win in dramatic fashion. Pavidis had to settle for second; Easton took third.

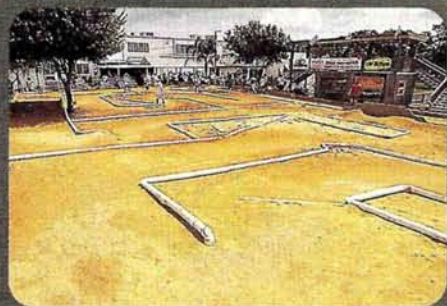
• **4WD Mod buggy, A1.** These are the fastest cars on the track. Kinwald, Francis and Dunbar left the starting grid and crossed the grid in the same order. Kinwald held off Francis for as long as he could. Francis had to worry about Dunbar making his move. Francis was able to take advantage of a rare mistake by Kinwald and opened a slight lead over the pack. There were no lead changes during the final 2 minutes of the race, as Francis took the first leg with a 12/5:17.13. Kinwald and Dunbar rounded out the top three positions.

• **2WD Mod, A1.** Kinwald must have been angry that he didn't win the first two races, as he left the line and never looked back. Francis kept the pressure on, but the two cruised to a 1-2 victory, Kinwald finishing with an 11/5:08.28 victory. Lloyd Dassonville was the beneficiary of an early pileup and snuck into third.

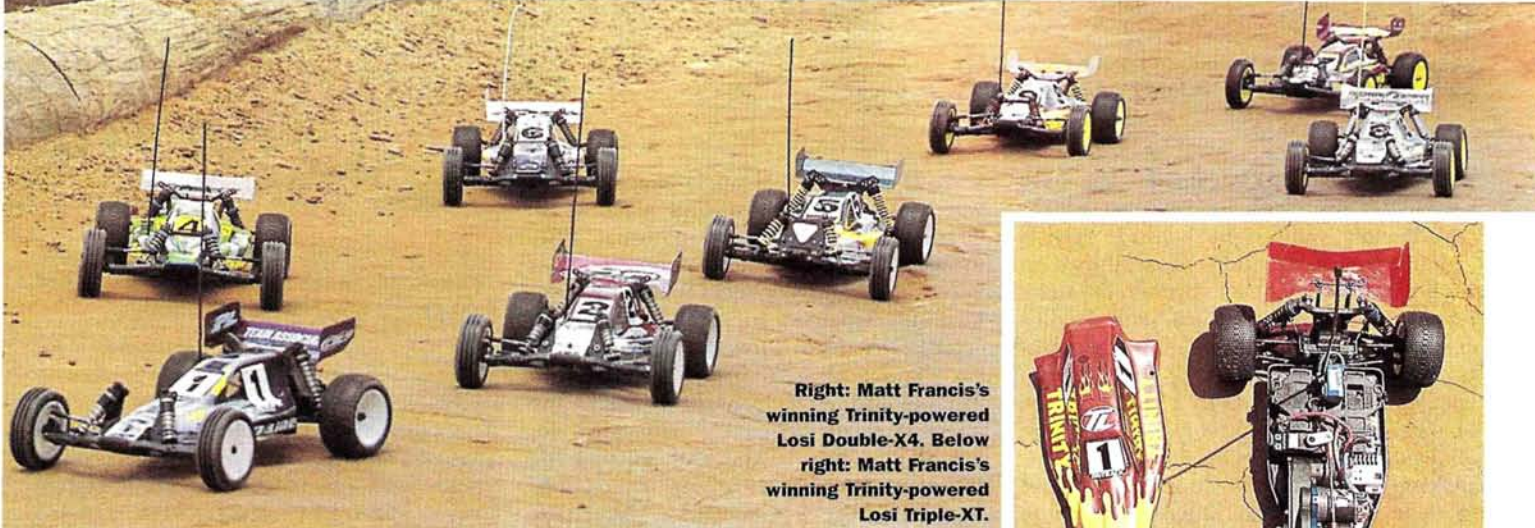
RAIN DELAYS

Florida can have some nasty weather. Up to 3 inches of rain fell an hour and sent racers looking for an ark. This happened just about every day and caused one round of

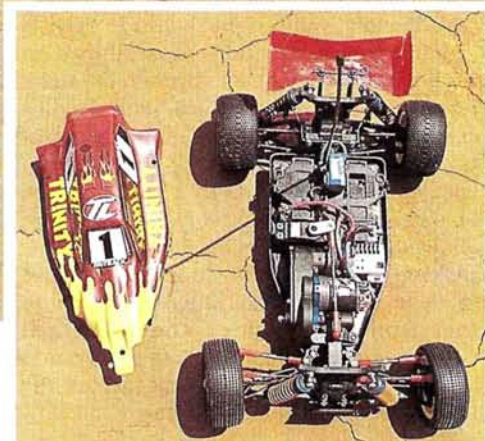
qualifying to be scratched. With all the free time, racers and I found some things to do at the track to fill the empty hours. There were several "mini nationals" at the Nationals.



Left: now that's some serious rain. They covered the track with tarps to try to keep it dry. "Try" was the operative word. Center: Mike Reedy suggested that sawdust be used to absorb the water after the track was swept. Right: when the sun came out and some laps were put down, the track dried out quickly and started to groove.



Right: Matt Francis's winning Trinity-powered Losi Double-X4. Below right: Matt Francis's winning Trinity-powered Losi Triple-XT.



• **Mod truck, A2.** Kinwald got the holeshot again, but it wasn't long before Francis made a move and got by Kinwald. Easton and Kinwald bumped, and Easton got by Kinwald. Dunbar, in fourth, capitalized and eventually passed Kinwald. Francis didn't think twice about looking back as he cruised toward a national championship in two heats. Easton and Dunbar rounded out the top three spots, while Kinwald pulled his truck off the track early.

• **4WD Mod buggy, A2.** Francis was looking for his second national title, as a win would again give him the victory. Two things were in his way: Kinwald and Dunbar! Kinwald led the pack around the

field from the start of the race with Matt and Dunbar challenging him. Francis and Kinwald collided several times. As a gesture of clean driving, Francis would allow Kinwald to regain the lead. With less than a minute remaining, Francis put the pressure on Kinwald and made a move on the inside to take the lead with 30 seconds to go. Kinwald took the lead back on the last lap, but on the last turn entering the straightaway, Francis just clamped the trigger and crossed the line 0.06 second before Kinwald for the most exciting finish of the race. Matt Francis claimed his second National title with a 12/5:12.09. Kinwald, Dunbar and Robbers rounded out the top positions in the second Main.

Making the video

XXX MAIN ALSO ATTENDED THE EVENT to get some footage for its next video release. A local skate park with more than 30,000 square feet of car-busting concrete graciously allowed



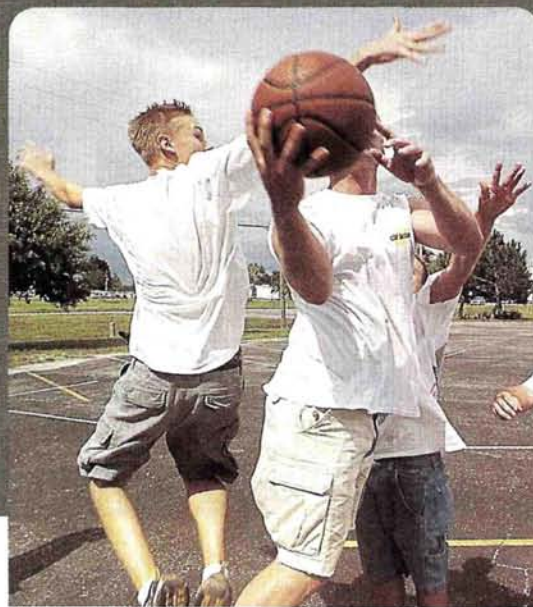
some racers to come and try some freestyle action. Jared Tebo, Adam Drake,

Richard Saxton and many others brought their vehicles down for a midnight run on the ramps. Local skaters and bikers were amazed when Drake and Tebo busted out with backflips over some spines, fun-boxes and lips. Some local racers' cars didn't fare that well, but luckily, there were plenty of spare parts to fix the broken arms. Look for the footage in the next video from XXX Main.



ATV Rage Nationals

Schumacher's Paul Wynn brought his PS2 to the track and hooked it up to the 72-inch screen, and during the rain breaks, the "2001 ATV Rage Nationals" took place. Drivers such as Richard Saxton and Mark Pavidis worked the controls. I worked all the drivers, and though we never held any true qualifying or Mains, I kicked everybody's butt. It's in print, so it must be true!



RC basketball Nationals

Losi's Jason Ruona went to the local Wal-Mart to purchase a basketball hoop, and the game was on. After the rain cleared, it was off to the court to see which drivers are good at roundball and which should stick to the drivers' stand. Again, I was compelled to show my skills on the court.

• **2WD Mod, A2.** Kinwald left the pack behind off the line with Francis; Dunbar and Pavidis were right behind. Francis caught a pipe early, and Dunbar flipped on his lid and dropped back through the field. Francis maintained second, and Pavidis claimed third. When Kinwald made a mistake, Francis took over the top position with 4 minutes to go. Only a few laps later, Francis caught a pipe of his own and allowed Kinwald to go by. Francis was able to keep the second position, but Pavidis made up some ground. Kinwald held on to the top spot for the National Championship with an 11/5:06.01. Francis and Pavidis followed Kinwald across the line in second and third places.

• **Truck Mod, A3.** The title was already in the bag for Francis, so he earned an observer's spot on the sidelines. The battle was for the second position, and Kinwald looked as if he would be the man in the third and final round. From the starting tone, Kinwald led the race. His only challenger was Brian Dunbar. Ryan Cavalieri swapped positions with Pavidis before Pavidis fell back, and Ryan ended up third. Kinwald took the win and wrapped up second overall with a 12/5:25.95.

• **4WD Mod, A3.** Francis again got to watch the battle for second place as he wrapped up his second national title. Kinwald put his Double-X4 on its lid as Travis Amezcua took over the top position. Kinwald remained in second, with Rob Schaffer in third. Kinwald kicked up the pace and pressured Amezcua to make a mistake and allow Kinwald to regain the lead. Amezcua kept pace with Kinwald, but BK hung on to the lead, putting the fastest lap times of the event in the books and taking the victory with a 12/5:10.06. Amezcua was second, and Schaffer finished third.



NEW FOR THE NATIONALS

ROAR HAS BEEN TINKERING with changes in racing formats, and at this year's Nationals, a couple of rules were implemented for the first time:

■ **5 MINUTES OF PLEASURE.** Let's face it: if you can't last 4 minutes with today's high-capacity cells, something is wrong. Heck, racing was 4 minutes long when we used cells of half this capacity. This year, the Nationals followed the nationwide trend of 5-minute heats. Racers were taking two hot laps to level out the voltage before the race even started. Do I hear 6 minutes?

■ **ONE TIRE FOR YOU.** This year's race also marked the first time handout tires were used for all but the exhibition 19-turn classes. Each class had specific handout tires. One set was included with the entry fee, and three additional sets could be purchased at a discount. Foam inserts were still up to the driver. Losi tires were the choice of the club. Most drivers didn't seem bothered by the spec tires; in fact, it saved a lot of time by eliminating the need to test which tires worked best.

■ **STOCKIFIED?** A 19-turn class has been debated for a while; nevertheless, it was a surprise when the class was included at the Nationals. The 19-turn class blurs the line between stock and modified. The two classes of 19-turn drew the local crowd and seemed to make racing more enjoyable for non-factory drivers. Who wouldn't want a national championship trophy? I registered for the 9-turn Hornet class, but it seems I was the only entrant. Damn.



IN THE PITS

FRANCIS EDITION TRIPLE-XT

This is the first sighting of the new, full-option Losi Triple-XT we all knew was coming. Graphite everything, Lunsford turnbuckles and red ball cups are all on the truck.

DIRT BAGZ PIT MAT

I get excited over these things; don't ask me why. The new Dirt Bagz pit mat makes your pit space look neater and gives you a clean place to work. The mat is very durable and will most likely come in a variety of colors.

TRINITY TRIPLE-X REAR HUB CARRIERS

Here's the first good look at the production model of these rear hub carriers. Francis and Kinwald have been testing them for a while, and Trinity now offers these blue aluminum carriers for the Triple-X. They allow you to adjust the roll center of your buggy and further dial in forward and side bite.



2001 ROAR 1/10 ELECTRIC OFF-ROAD MOD NATIONALS

• **2WD Mod, A3.** Kinwald was able to watch this race, as he clinched the National title in the second Main. Francis was in a position to tie down second; he got off to a good start with Mark Pavidis in hot pursuit. Brian Dunbar made an early charge but faded out of the running. After challenging Kinwald in the last race and getting a rhythm that continued until the last race of the day, Travis Amezcua eventually took the lead halfway through the race when Francis and Pavidis tangled. Pavidis put a charge on, with Francis right behind him. Amezcua couldn't hold off Pavidis in the final seconds of the race, and Mark took the third A-main with an 11/5:03.80. Travis Amezcua and Matt Francis finished second and third.



Clockwise from above: 2WD A-main top 10; Mod truck A-main top 10; 4WD A-main top 10.



RACE WRAP-UP

The Nationals are the biggest event you can attend in the U.S. This year's race was full of excitement. Brian Kinwald and Matt Francis put on a show for the crowd with their Trinity-powered Losi cars. If you ever can attend the

Nationals, it's well worth a day trip to catch some of the excitement that these professional racers demonstrate. My advice is to enter the race, if you can; the experience will last you a lifetime. Chances are slim that you'll win, but imagine if all the planets were in line that day, and you did. Congratulations to this year's winners, and especially to the Minnreg crew, who put on a world-class show. ■



WINNERS 2001

FINAL	QUALIFY	DRIVER	CHASSIS	MOTOR	BATTERY	ESC	RADIO	TIRE	PINION/SPUR
2WD									
1	1	Brian Kinwald	Losi Triple-X KE	Trinity	Trinity SMH	Novak C2	Airtronics M8	Losi	27/92
2	2	Matt Francis	Losi Triple-X KE	Trinity 12x2	Trinity SMH	LRP V7.1	Airtronics M8	Losi	23/92
3	4	Mark Pavidis	AE B3	Reedy Ti 11x1	Reedy SMH	LRP V7.1	Airtronics M8	Losi	*
4	5	Travis Amezcua	Losi Triple-X	Peak Aurora 11x2	Peak Sanyo	Novak C2	Airtronics M8	Losi	20/75
5	7	Lloyd Dasonville	AE B3	Reedy	Reedy	LRP V7.1	Airtronics M8	Losi	18/83
6	8	Phillip Antondo	Losi Triple-X	Trinity 13x2	Trinity SMH	Novak C2	Airtronics M8	Losi	22/78
7	0	Adam Drake	Losi Triple-X KE	Trinity 13x2	Trinity SMH	Novak C2	Airtronics M8	Losi	27/92
8	6	Ryan Cavalieri	Losi Triple-X	Trinity	Trinity SMH	Novak C2	Airtronics M8	Losi	25/92
9	3	Brian Dunbar	Losi Triple-X	Fantom	SMC	*	*	Losi	*
0	9	Rick Hohwart	Losi Triple-X	Peak 12x2	Peak 2400	Novak C2	Futaba	Losi	*

TRUCK									
1	2	Matt Francis	Losi Triple-XT MFE	Trinity 10x2	Trinity SMH	LRP V7.1	Airtronics M8	Losi	21/100
2	6	Billy Easton	AE FT T3	Reedy Sonic 2 10x2	Reedy SMH	LRP V7.1	Airtronics M8	Losi	18/87
3	3	Brian Dunbar	Losi Triple-XT	Fantom	SMC	*	*	Losi	*
4	1	Brian Kinwald	Losi Triple-XT MFE	Trinity	Trinity SMH	Novak C2	Airtronics M8	Losi	22/100
5	7	Mark Pavidis	AE FT T3	Reedy Sonic 2 10x1	Reedy SMH	LRP V7.1	Airtronics M8	Losi	*
6	4	Jason Ruona	Losi Triple-XT	Trinity 10x2	Trinity SMH	Novak C2	Airtronics M8	Losi	*
7	5	Ryan Cavalieri	Losi Triple-XT	Trinity D4	Trinity SMH	Novak C2	Airtronics M8	Losi	21/100
8	8	Travis Amezcua	Losi Triple-XT	Peak Aurora 11x2	Peak Sanyo	Novak C2	Airtronics M8	Losi	20/88
9	0	Scott Brown	Losi Triple-XT	Trinity 10x2	SMC	Novak C2	JR R1	Losi	18/86
0	9	Greg Hodapp	Losi Triple-XT	Peak	Peak	Novak C2	Airtronics M8	Losi	*

4WD									
1	2	Matt Francis	Losi Double-X4 WE	Trinity 10x2	Trinity SMH	LRP V7.1	Airtronics M8	Losi	21/100
2	1	Brian Kinwald	Losi Double-X4 WE	Trinity D4	Trinity SMH	Novak C2	Airtronics M8	Losi	23/100
3	3	Brian Dunbar	Losi Double-X4 WE	Fantom	SMC	*	*	Losi	*
4	4	Travis Amezcua	Losi Double-X4 WE	Peak Aurora 10x2	Peak Sanyo	Novak C2	Airtronics M8	Losi	17/86
5	8	Rob Schaffer	Losi Double-X4 WE	Peak Aurora 10x2	Peak Sanyo	LRP V7.1	Airtronics M8	Losi	*
6	0	Adam Drake	Losi Double-X4 WE	Trinity 9x2	Trinity SMH	Novak C2	Airtronics M8	Losi	*
7	9	Jesse Robbers	Losi Double-X4 WE	Fantom 10x2	Fantom 2400	Tekin G-10	KO Mars	Losi	18/86
8	6	Dave Montgomery	Losi Double-X4 WE	Orion Chrome 10x1	Orion V-max	LRP V7.1	JR	Losi	16/84
9	7	Scott Brown	Losi Double-X4 WE	Trinity 10x2	Trinity SMH	Novak C2	JR R1	Losi	18/82
0	5	Ryan Cavalieri	Losi Double-X4 WE	Trinity D4	Trinity SMH	Novak C2	Airtronics M8	Losi	22/100

* Driver did not supply information.

HOLIDAY

'TIS BETTER TO GIVE than to receive? We'll take your word for it; we want to get stuff!



And since it is the getting-stuff season again, what better time to give you our annual Holiday Wish List? Right after "world peace," we're penciling in the following on our must-have list.

WHAT WE WANT TO DRIVE

by the Staff of RC Car Action

DO ELVES

Team Losi Matt Francis Edition Triple-XT

Is there any doubt that this truck is the ish? It's a Triple-XT! With all the graphite! And red stuff! How can it be bad? It can't be. Sign us up, Santa. See the June 2001 issue for the original Triple-XT review, or read just about any race coverage for proof that the Triple-XT (and Matt Francis) wins races.

Matt Francis Edition Triple-XT—part no. LOSA 0075; \$249.95.

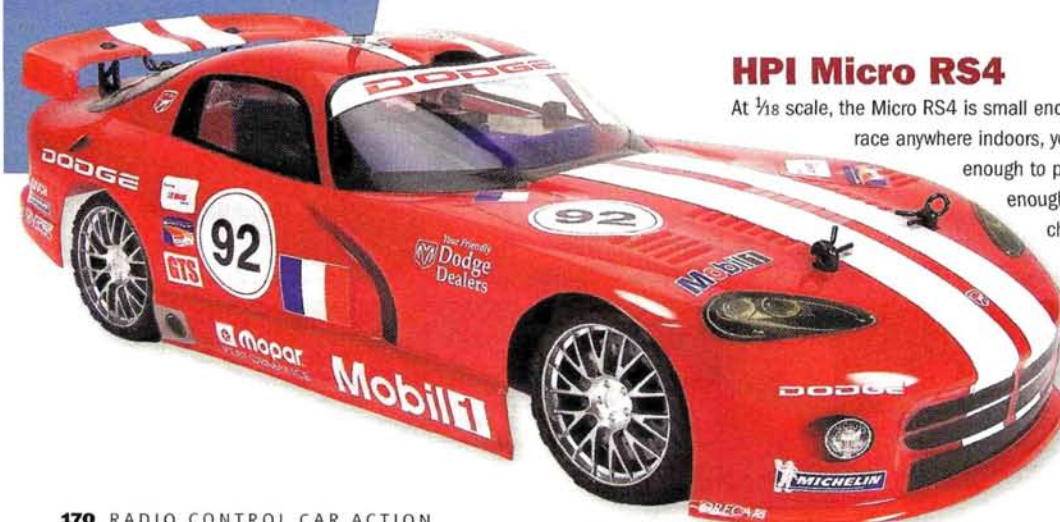


HPI Micro RS4

At 1/18 scale, the Micro RS4 is small enough to run and race anywhere indoors, yet it's still big

enough to play outside. It's also big enough for independent front suspension, a fiberglass chassis, full-time belt-driven 4WD (with diffs!) and full-size radio gear. Clear bodies make for endless painting possibilities, and the little cars are surprisingly quick; expect tons of hop-ups from HPI and the aftermarket guys, too.

Micro RS4—part no. Viper HPI601, BMW M3 HPI602, Skyline GTR HPI603; \$124.99.



Wish List

REALLY MAKE THIS STUFF?

GS Racing Storm RTR

There are other capable RTR $\frac{1}{8}$ -scale buggies out there, but the Storm is tough to beat. It includes a JR-XR3 FM radio set, heavy-duty steering servo and all the important tech features you want in a nitro buggy: all metal, helical gears; sealed diffs; 3mm chassis with side guards; full bearings; sealed radio box; and a powerful pull-start engine with tuned pipe.

Check out the November 2001 issue for a full review.

Racing Storm RTR—part no. GSC 2003; \$549.



Tamiya TXT-1

Are you a "Real monster trucks don't have independent suspension" guy, or just a trick-truck kinda guy, or a Tamiya fan? Whatever you are, you'll want a TXT-1; we do. From its cantilever-suspended, aluminum-tube frame-style chassis to its beefed-up Juggernaut 2 drive train and factory-finished Lexan body, the Tamiya Extreme Truck is the best example of a straight-axle monster ever to hit RC.

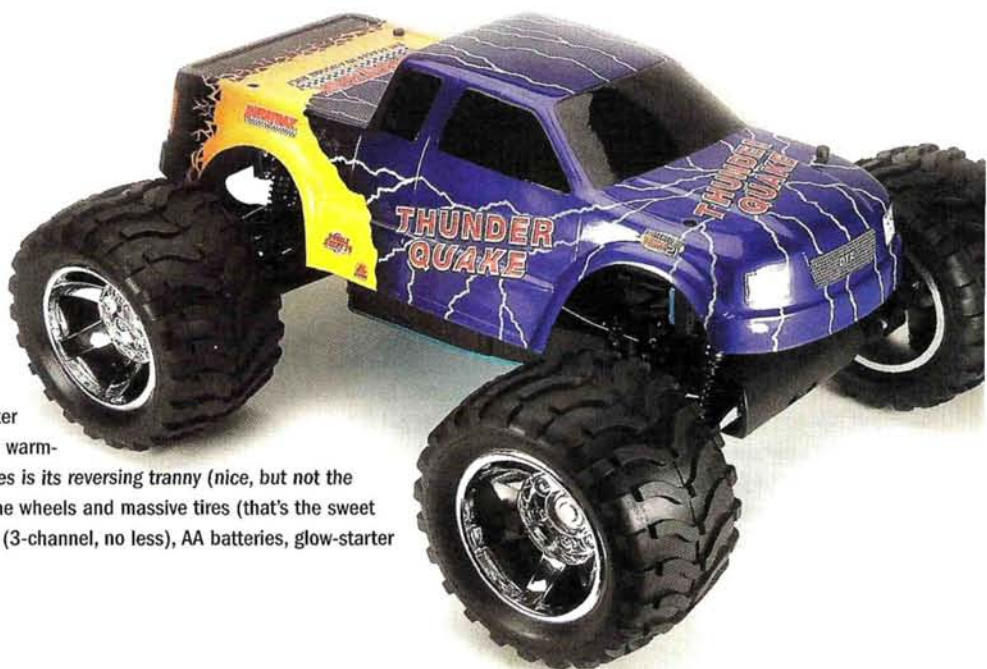
TXT-1—part no. TAM58280; \$454.99.



DuraTrax Thunder Quake

The Thunder Quake has roots in the DuraTrax Axis and Monster Quake, but the latest DuraTrax big truck is no $\frac{1}{8}$ -scale buggy warm-over. What sets the Thunder Quake apart from those machines is its reversing tranny (nice, but not the dealmaker) and its w-i-d-e suspension arms, the deep-chrome wheels and massive tires (that's the sweet stuff). Of course, you also get DuraTrax-by-Futaba radio gear (3-channel, no less), AA batteries, glow-starter and fuel bottle—everything you need except fuel.

Thunder Quake—part no. DTXD74**; \$549.99.



Team Associated Nitro TC3

You could say it's a TC3 with pivot-ball suspension, a 2-speed and what appears to be a YZ250 exhaust pipe, but the new Nitro TC3 is much better described as an all-new car than as merely a nitro-fied version of the electric TC3. And if the Nitro TC3 makes as big a splash on the nitro touring-car racing scene as its electric forerunner did, look out; you'll be seeing a lot of these bad boys.

Nitro TC3—part no. ASC2030; \$446.39.



Traxxas T-Maxx ...

... or an E-Maxx; we're not picky. It's not as if we're going to leave it stock, anyway. Even though we've built a bunch of Maxx project trucks already, there's just so much aftermarket stuff for the Maxxes that we want to build more! That means we need more trucks. Overnite 'em, please; we can't wait for Santa, and the boxes are too big to fit down the chimney anyway.

T-Maxx—part no. TRA 4910; \$425.

E-Maxx—part no. TRA 3906; \$379.

WHAT WE WANT TO SET IT UP WITH

Pro-Line Maxx Road Rage tires and Outback wheels

Pro-Line's giant-size road tires were actually good for a 3mph speed increase over the stock Traxxas tires when we radar-tested, Kevin Hetmanski's Hardcore .21-converted T-Maxx (August 2001), and the massive meats are stickier than your hands after an all-you-can-eat night at House of Ribs. Oversize foam inserts are included, and in case you're wondering, those are Pro-Line's Outback wheels (not included) inside the rubber.

Maxx Road Rage tires—part no. 1082-00; \$29.

Outback wheels—part no. 2656-01; \$18.



LRP Quantum ESC

It's the Chris Chianelli of speed controls: small, but powerful. Of course, the LRP Quantum is also new, whereas Chris is, um, not. But let's not push the analogy too far, OK? The Quantum has been in the works for a while, and it's a real achievement for LRP. Without the need for any external programming devices, you can set the Quantum's "Punch Control," initial brake value and automatic brake (drag brake) value to match your needs. Its small size makes it easy to fit in any car, and there's no need for an external capacitor.

Quantum ESC—part no. ASC LRP 8082; \$214.99.



Protoform 190mm Honda Civic body

Yeah, you thought you were gonna mack out your Civic with some Spoon gear, coil-overs and JDM lights, but six months later, it's still at full ride height with no wing and a baby seat in the back. Save your money, and hook up a Civic, RC-style! Protoform's 190mm sedan shell will give your ride instant tuner style, and it's easy to get a great-looking result even with a single-color paint job, thanks to the included window masks and decals.

190mm Honda Civic body—part no. 1439-00; \$23.



Hardcore Racing Goldi-Maxx

Whoa—and we thought we were pimpin' in the October issue! Hardcore now offers a gold finish on all its trick aluminum T-Maxx and E-Maxx parts (as well as other vehicles, presumably), but don't look for the Fort Knoxified parts in a poly-bag on the hobby shop wall; the gold gear is strictly special-order stuff. So call 'em up, and go for the gold!

Hardcore Racing gold-finish aluminum upgrades; special order only.



Trinity P-94 Modified

With new magnets, a new endbell and a unique brush system that delivers more power and efficiency than any previous mod motor (according to Trinity), the P-94 represents the cutting edge in electric horsepower. There is a pair of P-94 cans to suit the specific wind you choose (solid can for low turns, vented for high turns), and all P-94s include three surface-mounted capacitors.

P-94—part no. varies with wind; \$75.



Futaba 4V transmitter

A stick radio? Have we gone mad? Or European? Not at all ... we just like the new Futaba 4V because it's the perfect radio for Tamiya's line of tanks, such as the Tiger 1 reviewed in *RC Car Action's* August 2001 issue. When you have a turret to turn and machine guns to fire, two channels won't cut it. Stick it to 'em!

4V transmitter—part no. FUTJ 62; \$214.99.**



Novak XXtra receiver

We can't say enough about the Novak XXtra, but to say it all, you really need to say very little. Try this on for size: *no more receiver crystals*. Just twist a couple of dials to match the XXtra to your transmitter frequency and hit the track—no crystal to lose or fail. You gotta love that.

XXtra receiver—part no. 27mhz 2627, 75mhz 2675; \$120.

Team Orion Micro RS4 stuff

If there's going to be a Micro RS4 under the tree, how could you not want this stuff? First, the motors: the Elite Modified features a coreless design for (according to Orion) two to three times the power of the HPI stocker. The Elite Stock is built for performance and longevity, even with Orion's 7.2V pack. And that brings us to the battery packs! Team Orion's Micro NiMH 1100mAh 6V (5-cell) and 7.2V (6-cell) battery packs use high-quality cells assembled with low-resistance tabs for maximum power.

So how 'bout a speed control to tie it all together? Team Orion's heat-shrunk Blast packs push-button setup, high-frequency operation, forward, brakes and reverse in an ultra-thin, 5mm-high package—just right for micro-action.

Micro RS4 stuff—part no. Elite Modified 20900; \$69.99. Elite Stock 20901; \$12.99. 1100mAh battery 13010; \$38.99. Micro Speed Control 65000; \$59.99.



OFNA Gel-Cell Starter Box

There are lots of decent starter boxes out there, but we like the OFNA box because it comes with a long-lasting gel-cell battery that will crank your engines to life all day long without needing a recharge. The power panel with built-in glow starter and battery meter is a bonus, and there's even a pair of jacks that tap into the gel-cell so you can run a battery charger off your starter box to keep your receiver pack juiced up. Sweet.

Gel-Cell Starter Box—part no. 10257; \$139.95.



Airtronics M8 Special Edition

Airtronics has made some minor programming tweaks to the Special Edition M8, but the big features are strictly for cool: the LCD display is now backlit in Timex' Indigo-style blue, and the power LED is also a vivid blue. It's the coolest radio ever (*RC Car Action's* "Readers' Choice" four years running), and it's the perfect match for the Matt Francis Triple-XT, which also made this list.

M8 Special Edition—part no. AIR 90281; \$299.

WHAT WE WANT TO BUILD IT WITH



Hudy nut drivers

Ah, Hudy tools. So strong. So well machined. So personalized with your name engraved in the handle (or, if you like, you could have "Return my tools or I will kill you" engraved in the handle). They're simply the best nut drivers you can buy—from their knurled aluminum handles to their precision-ground, spring-steel shafts and sockets.

Nut drivers—part no. varies with wrench size; \$14 to \$16 each.

RPM wrenches

Since Santa's paying the bill, why not get the best? We know what you're thinking: "But aren't RPM wrenches inexpensive?" Hey; who says tools have to be expensive to be good? RPM's wrenches have the good stuff where it counts: in the tips. Heat treated and precision ground, RPM hex drivers do what good tools should do: fit right and last a long time. The handles are comfortable, durable plastic, light and easy to spin. Buy the four-piece metric or standard set, and you get a flip-up storage case.

Hex drivers, metric—part no. 1.5, 2.0, 2.5, 3.0mm; \$34.95,

Hex drivers, standard—part no. .050 in., 3/32 in., 2.5mm, 1/16 in.; \$34.95. ■



SOURCE GUIDE

AIRTRONICS

1185 Stanford Ct., Anaheim, CA 92805; (714) 978-1895; www.airtronics.net.

DURATRAX

Distributed by Great Planes Model Distributors, 2904 Research Rd., P.O. Box 9021, Champaign, IL 61826-9021; (800) 682-8948; www.duratrax.com.

FUTABA

Distributed exclusively by Hobbico/Great Planes Model Distributors Co., P.O. Box 9021, Champaign, IL 61826; (800) 682-8948; www.futaba-rc.com.

GS RACING

Distributed by Horizon Hobby Inc., 4105 Fieldstone Rd., Champaign, IL 61822; (217) 355-9511; www.horizonhobby.com.

HPI RACING

15321 Barranca Pky., Irvine, CA 92618; (949) 753-1099; www.hpiracing.com.

HUDY SPECIAL PRODUCTS

Distributed by Serpent Inc. USA, West Park Center, 2830 NW 79th Ave., Miami, FL 33122; (305) 639-9665; www.hudy.net.

LRP

Distributed by Team Associated, 3585 Cadillac Ave., Costa Mesa, CA 92626; (714) 850-9342; www.teamassociated.com.

NOVAK ELECTRONICS INC.

18910 Teller Ave., Irvine, CA 92612; (949) 833-8873; www.teamnovak.com.

OFNA RACING

22692 Granite Way, Ste. B, Laguna Hills, CA 92653; (949) 586-2910; www.ofna.com.

PROTOFORM INC.

Distributed by Pro-Line.

PRO-LINE

P.O. Box 456, Beaumont, CA 92223; (909) 849-9781; www.pro-lineracing.com.

RPM R/C PRODUCTS

14978 Sierra Bonita Ln., Chino, CA 91710; (909) 393-0366; www.rpmrcproducts.com.

TAMIYA AMERICA INC.

2 Orion, Aliso Viejo, CA 92656-4200; (800) TAMIYA-A; www.tamiya.com.

TEAM ASSOCIATED

3585 Cadillac Ave., Costa Mesa, CA 92626; (714) 850-9342; www.teamassociated.com.

TEAM LOSI

Distributed by Horizon Hobby Inc., 4105 Fieldstone Rd., Champaign, IL 61822; (217) 355-9511; www.horizonhobby.com.

TEAM ORION INC.

22601 La Palma, Ste. 103, Yorba Linda, CA 92877; (714) 694-2812; www.team-orion.com.

TRAXXAS CORP.

12150 Shiloh Rd., #120, Dallas, TX 75228; (972) 613-3300; www.traxxas.com.

TRINITY PRODUCTS INC.

36 Meridian Rd., Edison, NJ 08820; (732) 635-1600; www.teamtrinity.com.

Build any kit better

by Peter Vieira

Over 20 tips to get the job done right

The best way to get good at kit building is to build a bunch of kits; too bad most of us only get to do it once or twice a year! Instead of waiting a decade (or getting a job in a hobby shop at Christmastime) to build up a base of building experience, just follow these tips for an enjoyable escape from the real world with your best build ever.

Check the instructions before you begin

Even a quick read of the manual will help you become familiar with the building process; if you study it more carefully, you can head off potential problems before you have to tear down improperly assembled parts. As you read the manual, look for steps that might be easy to goof up, and make notes where you think they might help. I watch out for:

■ **Shock-tower assembly.** The long screws that hold the shocks and the ball studs for the camber links may be on the same side of the tower or on opposite sides. If I don't pay attention, I usually go wrong here. I have even been known to build it wrong, take it apart to fix it and then goof up a second time!

■ **Screw length, type and locations.** Note steps that require you to use screws of the same length; if your kit includes full-size drawings of the hardware, carefully consult them. Also be sure to follow the dotted line that shows where the screw is meant to go; a screw might look as if it's lining up with one hole but the dotted line leads it to another.

■ **Lefts and rights; fronts and rears.** This is a particular biggie for steering assemblies and hub carriers. Pay particular attention to the stamped-in "R" and "L" that indicate "left" and "right," and see to it that your subassemblies match the illustrations shown in the manual.



Set up a well-lit, clutter-free building area

■ **Use a pit towel.** If you don't have an old towel to sacrifice for RC, just pick up any cheap towel at a department store (or get a snazzy one like the Hudy model in these pictures). The towel will prevent parts from bouncing and rolling, it will protect your bench (or the kitchen table), and it will absorb any liquid you spill.

■ **Parts and hardware trays.** Keep these handy. Bolink sells a tray that's perfect for small parts, or you can use take-out container lids, fishing-tackle boxes, muffin tins, or other similar containers to keep parts organized. As I build, I like to dump the contents of each parts bag into their own container.

■ **Light.** Make sure you have plenty of it. Ott Lite's portable lamp is ideal for shedding extra photons on your work, and when you've finished, folds for storage.



Measure with a caliper

I have a deluxe digital caliper, but even an inexpensive plastic model is ideal for RC use. A caliper will allow you to build camber links and shocks to the precise lengths given in the manual far more accurately than a ruler will, and you'll find many other uses for it as well.



Get the right tools

I've never regretted investing in high-quality tools; as the saying goes, "If you buy cheap, you buy twice." Don't skimp on the basics.

■ **Hex drivers.** Thorp (from MIP), Hudy and Trinity make some of the best, and RPM drivers are my favorites for value and performance.

■ **Screwdrivers.** With nos. 1 and 2 Phillips-head drivers, a 1/4-inch flat-blade screwdriver and a set of jeweler's screwdrivers, you'll be ready to tackle any job. DuraTrax also offers excellent screwdrivers that have padded handles and coated tips.

■ **Pliers.** A pair of slip-joint and needle-nose pliers will cope with most jobs; those who run nitro models will find a pair of channel-lock pliers useful for holding flywheels.

■ **Flush cutters.** A good-quality pair of flush cutters makes short work of removing parts from their trees without leaving excess



material on the part. They're also good for cutting fuel line and silicone wire. Tamiya and Hobbico make the best.

■ **Hobby knife with no. 11 blades.** Here, quantity is more important than quality. I've never encountered a bad blade, but all blades should be replaced often. X-Acto is the big-name brand, and Excel also offers a wide line.



"Assembly line" identical assemblies

Shocks are the prime candidate for "assembly lining," but the technique

is good for any steps that have to be repeated. The idea is that you should prepare and sort all the parts required for identical assemblies so that you'll be able to build them more quickly. This technique will also help you avoid such annoyances as finding you have a shock body full of oil, but you no longer have two hands free to cut the shock cap off the parts tree.

Grip shock shafts without scoring them

Everyone knows you can wrap a rag around the shock shaft so your pliers won't score it, but the rag also prevents the pliers from gripping well. Here's an easier way: use the pliers' cutting jaws to hold the shock shaft where the threads meet the

smooth part of the shaft. If you still have a hard time because of a tightly fitting shock eyelet, hold the eyelet with your pliers and pre-thread it with a screw. It should be much easier to install when it has threads.



Screw installation, locking and lubing

■ **Save that thread-locking fluid!** Don't you hate it when you try to squeeze a tiny drop of thread-lock onto a screw and wind up squirting a week's supply over your fingers? Make that thread-lock last by dripping a drop or two onto an empty parts bag. To apply the thread-lock, just touch the threads of the screw to the puddle of fluid.



■ **Lube screws with soap for easier installation.** Uh-oh ... you're threading a screw with a 1/16-inch head into graphite plastic, and the going is tough. Hopefully you'll bottom it out before it ... too late: the head stripped. You can avoid this by lubing the screw with a quick swipe down a bar of soap. The soap will allow it to turn more easily, and since the soap is dry, it won't attract dirt.

■ **Use fuel tubing to insert screws into tough spots.** Ever tried to balance a screw on the tip of your hex driver to insert it into a tight spot, only to drop it just before it meets

its hole? And then repeated the process, like, 10 times? Here's the solution: slip a piece of fuel tubing over the tool, insert the screw into it, and twist away.



Radio tips

■ **Center servos before you install them.** Cool! You're ready for that first run with your just assembled car. You plug in the pack, turn on the radio, and—zoop—the steering servo swings full left, and it won't center, even with a full twist of the trim knob. To avoid this, center the servos before you install them, and mark the output shafts' center position for future reference. It's also a good idea to range-test your gear before you install it—just in case.

■ **Bundle servo leads.** Here's how (there are two techniques): first, the coil technique. Just wrap a lead around a screwdriver shaft and then plug it into the receiver to hold the coil. To bundle up a long lead, fold it over itself into a stack, then secure with zip-ties. To make stacking easier, wrap the lead around wrench tips; for style bonus points, substitute slices of fuel tubing or silicone insulation for the zip-ties.

Tire tips

■ **Note tread direction before you glue.** If your directional treads point in the wrong direction, people will make fun of you. You'll deserve it, too.

■ **Use high-quality CA.** Losi, Pro-Line, Trinity and others all make such CA just for tires. Use the name-brand stuff; it's worth it.

■ **Rubber-band tires after gluing.** A nice, wide, no. 64 rubber band is just the thing for putting the squeeze on your tire and rim combo after you've glued them together. It's the only way to go for a gap-free glue job.

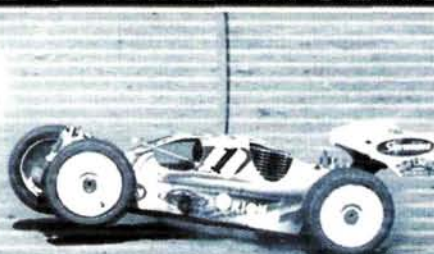


The ol' paper trick. ▶

To set pinion/spur mesh, feed a piece of notebook paper between the pinion and spur gears, press them together, and then tighten the motor screws. Roll the spur gear to remove the paper, and voilà—perfect gear mesh.

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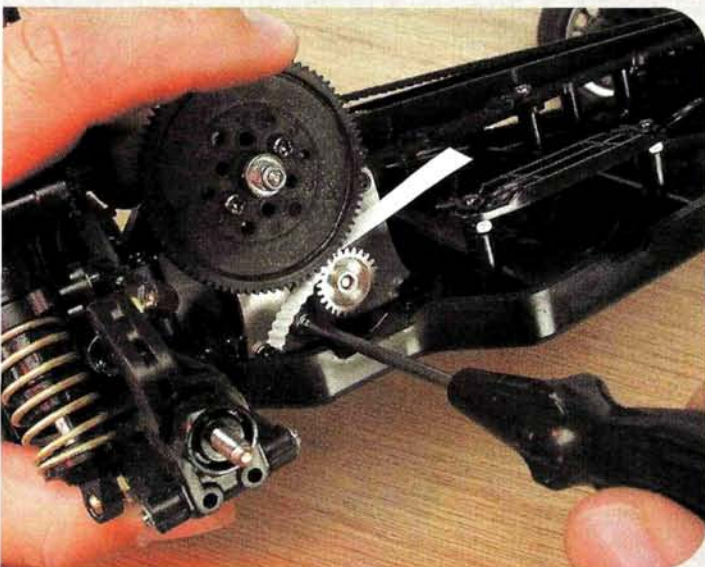
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I know "gooder" isn't a word, but "better" doesn't begin with "G."

■ To lubricate pinion and spur gears without leaving dirt-attracting residue, use a "dry" teflon lube, available under a variety of brand names from your local bike shop.

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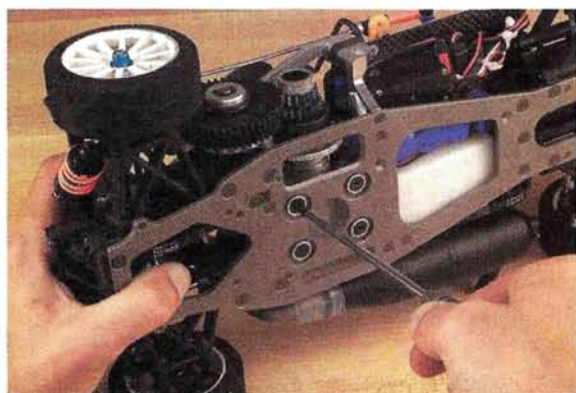
Replace a piston and sleeve

by Greg Vogel

Make your engine run like new

answer to all of those questions was “Maybe,” because the real answers lay within the abilities of the person doing the asking (for the record, we did sell Pokemon cards, but I just liked to mess with the kids’ minds). In my experience, with a little instruction, anyone can work on a nitro engine. That’s where this “how-to” comes in; the following will help even nitro novices complete the most common (and most beneficial) engine-maintenance tasks—piston and sleeve replacement. After

you’ve completed this job, you’ll know your engine inside and out, and it will run like new!



Step 1. Remove the engine from the car

An engine is usually held in with four screws on the bottom and is connected to the throttle linkage and exhaust. Remove the retaining hardware and yank the engine out of the vehicle.



Step 2. Remove the heat-sink head

Most heads are held on with four screws, and some have as many as six. Access the screws from the top; remove each one and then gently pull the head straight up and off the engine case.



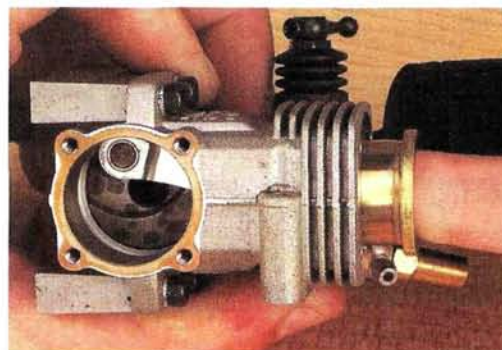
Step 3. Remove the pull-starter

If your engine doesn't have a pull-starter, move on to step 4. Starter assemblies are held on with three or four screws on the back. Remove the screws and pull the assembly off the back of the engine. While removing the starter, I like to slip a flat screwdriver between the starter and the backplate and apply pressure to the inner spool. By doing this, I prevent the spring and spool from uncoiling (a huge headache!). Having removed the starter, stretch a rubber band around it to prevent it from uncoiling.



Step 4. Remove the backplate

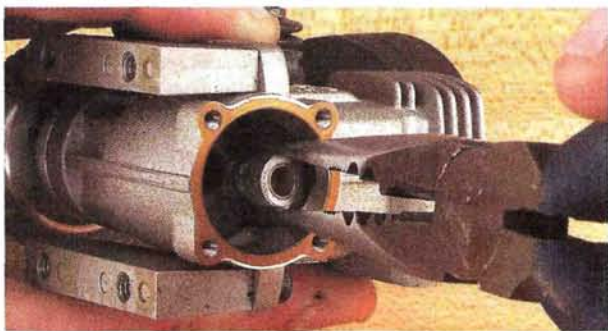
The backplate is held on with four screws that you unscrew to remove it. If your engine has a pull-starter, when you remove the backplate, watch for the one-way bearing falling out. If it falls out, note how it comes out because you'll want to reinstall it in its original position. Also note the flat part on the inside of the backplate; it always faces upward to allow the piston to clear the backplate when the piston cycles.



Step 5. Slip the sleeve out

Depending on your engine's age and how much you've run it, this part can be tricky. In this step, we'll remove

the sleeve. If you look down at the top of the engine, you'll see a brass-colored ring—the sleeve—with an aluminum circle—the piston—in its center. Push the piston down with one finger. Now apply pressure to the sleeve's inner wall and pull the sleeve out. It should slide right out; if it doesn't, you may have to pull it out of the engine case by grabbing its top with a large pair of pliers and gently rocking it free.



Step 6. Remove the piston and rod

This step is also a little tricky, so take your time. Hold the engine upside-down so the piston is at the bottom. Grab the rod with a pair of long-nose pliers, and gently rock it off the crankpin. You may need to rotate the crank slightly to remove the piston and rod assembly (this will depend on your engine). When the rod is clear of the pin, the assembly should slide right out of the top of the engine. Note how the piston comes out; many are notched and can be installed only in a certain way, and you'll want to reinstall the new piston correctly.



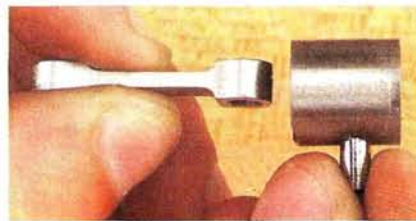
assembly, make certain that the notch is in the correct position. Just slip the assembly into the engine, and use needle-nose pliers to put the connecting rod on the crankpin.



Fuel?

Which type of fuel should you use for break-in? Well, opinions vary. Many engine gurus say you should break in an engine with a low-nitro/high-oil break-in fuel. Others will tell you to break it in with the fuel you plan to run with. Some will say that you should start with a low-nitro fuel (10 percent), and after running through a quart, switch to the fuel

you plan to use from then on. Ultimately, it isn't the fuel that's important; it's what you do with it. For at least four tanks, always be sure to run your engine as rich as you can without its stalling. In the end, your engine will last longer and be less likely to run erratically.



Step 7. Assemble the new piston and rod

If you're replacing the piston and sleeve, consider also replacing the connecting rod and wristpin. You could use the old one if it isn't damaged, but this is a highly stressed part and could break when you run it with a new—tight—piston and sleeve. If you use it



and it does break, not only will you have to replace the rod, but you'll need a

new piston and sleeve as well because they are usually damaged when the rod fails.

Assembling these parts is fairly easy. Put the connecting rod into the piston and slide the wristpin through the larger hole in the piston and then through the rod to the other side. Now use a needle-nose pliers to clip the wristpin into the retaining

clip. This can be tricky; the clip can be very stubborn and might pop out. I complete this step holding the parts in a large clear bag; if the clip pops out, I have a better chance of finding it.



Step 9. Slip the sleeve in

Most sleeves are aligned in the engine by a pin; note where the pin is in the crankcase, and align it with the notch in the sleeve and slide the sleeve in. You may have to rock the piston to get the sleeve to slide all the way in. Use the eraser side of a pencil to rock the piston into place.



Step 10. Button it up

The major surgery has been completed.

Now, all you have to do is reinstall the heat sink and the backplate or pull-starter, and then your engine is ready for your car.

Your new, used engine

You've just rebuilt your engine, and you're ready to go out to play. Not so fast! You basically have a new engine in your car, and you must go through the break-in procedure all over again. Pull out your engine instructions, reset the carburetor to the manufacturer's suggested break-in settings, and follow the recommended break-in procedure.

Typical break-in carburetor needle settings:

- low-end needle: 2½ turns out
- high-end needle: 3 turns out

I suggest that you run one or two tanks of fuel through the engine at idle at these settings. For the third through fourth tanks, run the car around in a figure-8, but never go at full throttle, and avoid straining the engine by running it over obstacles. After the fourth tank, start to lean the engine 15 percent at a time until you reach optimum performance and start to have fun. Remember: if you rush break-in, you risk having problems later on.

THE END

Replacing the piston and sleeve is easy, even if you don't have a lot of technical know-how. When you disassemble the engine, note in which directions the parts are facing when they come out; if they

have flats or other identifying marks, note their orientation when you remove them. Now you'll be able to use your disassembly notes to rebuild your engine. If all else fails, return to the engine's instruction manual to see how it comes apart. ■

BY KEVIN
HETMANSKI

Time Warp: Kyosho Double Dare

The year was 1989. George Bush (no "W") was elected president, the Berlin Wall was taken down, and the San Francisco 49ers won the Super Bowl. Not that I really cared about any of that at the time; I was 14 years old, and Kyosho's new Double Dare monster truck was the only thing that interested me. Kyosho designed the Double Dare to compete with the Tamiya Clod Buster, and like the all-powerful (at the time) Clod, the "DD" had dual motors and 4-wheel steering. But other than those similarities, the DD was uniquely Kyosho in its design. See for yourself.



Here is a part of RC monster truck history: the Kyosho Double Dare. Some of its features were dual motors, eight "shocks" and huge monster-size tires. Check out that sweet dummy engine on top of the body mount. The Double Dare also came fully detailed.

ENCLOSED TUB CHASSIS

A large plastic tub is the backbone of the Double Dare. The front and rear gearboxes are attached to the chassis with four screws each. Lower chrome chassis braces stiffen up the entire assembly. The battery is mounted sideways on the chassis' center for easy installation and removal. The steering servo, throttle servo, speed control and receiver are screwed to the inside of the tub, and a large plastic cap protects them.

THEN Whatever. Put the body on!

NOW The DD chassis is actually pretty cool. I like that it's enclosed; the electronic gear is protected, and the truck is easy to clean.

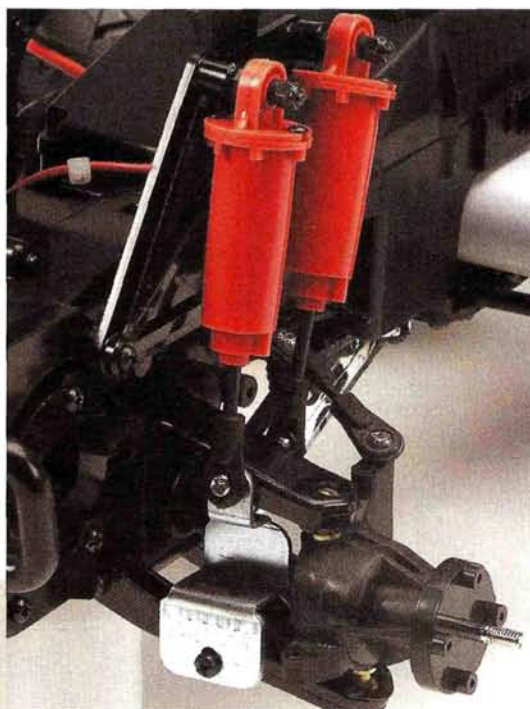
Kyosho designed the Double Dare to use independent suspension. Two "shocks" are mounted on each of the upper suspension links, but only one has an internal spring to support the suspension; the other is purely for show.

INDEPENDENT SUSPENSION

A fully independent front and rear suspension is found at the front and rear of the truck. The upper and lower suspension arms pivot on large pivot balls that are attached to the steering knuckles; camber is not adjustable. Two plastic shocks control the suspension arms; only one of them has an internal spring. Since the shocks have internal springs that are impossible to get at, you cannot adjust the ride height. The tops of the shocks are mounted on plastic, non-adjustable shock towers, and the bottoms of the shocks are mounted on the upper suspension links.

THEN Eight shocks!

NOW Eight non-adjustable friction shocks, ugh. I'll take oil-filled dampers, please!



4-WHEEL STEERING

The Double Dare has 4-wheel steering and uses one servo to turn the front and rear wheels. Two racks with pivot balls attached to them slide side to side in the front and rear of the chassis, and they are connected to the steering knuckles with non-adjustable rods. A pin attached to the servo-saver slides into a groove in the rack and pushes it from side to side. A hardened-steel, U-shaped rod connects the rear steering rack to the front rack.

THEN Wow! All four wheels steer!

NOW Wow! All four wheels steer ... barely.



Back in the day, Kyosho used female Tamiya-style connectors on its speed controls, even though the rest of the RC world put the female connector on the battery. A double-ended male adapter had to be used to attach most battery packs to the speed control.

HEAVY-DUTY MECHANICAL SPEED CONTROL

Two motors pull a lot of amperage through a speed control so Kyosho included a newly designed heavy duty mechanical speed control that was made specifically made for the Double Dare. It is operated by a single servo and features 3-step forward and reverse. A see-through plastic cover protects the speed control and servo.

THEN Mechanical speed control? That must be the best kind!

NOW I'll just buy an ESC.

DETAILED NISSAN BODY

A clear Lexan Nissan Pathfinder body covers the Double Dare chassis. Most Lexan bodies are mildly detailed with window moldings and grill details; that wasn't good enough for the folks at Kyosho. They also threw plastic detail pieces into the mix such as a light bar, front and rear bumpers and a detailed chrome engine (complete with wire-mesh velocity stack covers) that sticks out of the hood.

THEN Aaaaawweeeesome!

NOW I still think the DD body set is pretty awesome, but I missed having window masks. Overspray film was included, though. I wish I could get that dummy engine as a replacement part! I'll check on eBay—that's where I bought the truck.



The electronics are protected by a large plastic cover. An opening in the case is provided so that you can see the action of the MSC.

CHROME WHEELS AND CHEVRON/LUG TIRES

The Double Dare rides on huge 5.7x2.9-inch "Terra" tires. They come out of the box already mounted on the stylish, chrome-plated 12-spoke rims.

THEN Those chrome wheels look killer, and the tires are huge!

NOW Those chrome wheels still look good, even in the era of polished real-aluminum T-Maxx rims. The DD tires are a bit narrow, though.



The Double Dare motors had gold and silver labels to identify which end of the truck they were meant to be installed on. Large plastic bumpers protected them from damage.

DUAL MOTORS

The Kyosho Double Dare uses independent front and rear gearboxes that are securely bolted to the tub chassis. The included Le Mans 05 stock motors are mounted towards the outside of the truck, and thick plastic bumpers protect them. The motors are color-coded to help the builder remember which one goes in front (gold) and which one goes in the rear (silver). Slots in the gearboxes allow the final gear ratio to be changed. Two plastic covers included in the kit slide over the endbell of the motors to keep dust and dirt out of them and extend their life.

THEN Gosh, two motors, and they're big 540s, not 380s. That thing must haul!

NOW Two 540s? It still isn't enough. But as a Clod-contender, a pair of silver cans was a match for Tamiya's big truck.



Pro-Line brake discs

Pro-Line helps you Traxxas Maxx owners add style and realism to your truck with no-mod disc-brake rotors. The metal rotors fit over special hex hubs (included) that sandwich the disc between the rim and the hub. They're purely for looks, but if someone figured out a functional caliper system, I bet the Pro-Line discs would stop the truck in a hurry! Maxx disc-brake rotors—6204-00, \$24.99.



GPM aluminum receiver and battery cover

Just when you thought you couldn't get enough aluminum parts for the Traxxas T-Maxx ... GPM's receiver and battery cover are constructed of multiple pieces of aluminum plate that are held together by small screws. For the everything-must-be-aluminum diehard, these parts are musts.

Alloy receiver box—TMX1525, \$33.

Alloy battery box—TMX1526, \$38.

SHOP TALK

I have a Traxxas T-Maxx with Parma offset hexes installed to improve my truck's handling. After a few minutes of running the truck, the wheel nuts loosen up, and I sometimes even lose a wheel. What is causing this?

When you install the offsets, this moves the wheels out farther on the axle giving you less threads to tighten the nut onto. The nuts that hold on the wheels have a small nylon insert at the end of them to prevent them from loosening. If you are able to tighten the nuts enough, the threads will be in contact with the nylon insert, but only a little of the threads will be touching the insert. If you have new nuts, they may not fall off; but if you are using worn nuts, the insert will not have enough of a grip on the axle threads, and they will loosen up. Add a little thread-locking compound to the threads before you install the wheel nuts. That should keep them in place. ■

If you have any problems or questions about trucks, or if there is something you would like to see in "4x4," email me at kevinh@airage.com or send your letters to:
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Stringin' the lights

One of my favorite things about December is all the lights. For me, even more than pies and presents, it's the decorated houses that make my holiday. Since this is the December issue, and you've no doubt already sent your letter off to the big red guy, I thought we'd string the lights together on an RC car.

One of the hottest setups for body illumination comes from the gang at RC Neon. Their gallium-nitride LED lighting systems are so bright that they're visible in daylight and throw off plenty of light for nighttime running, as well; best of all, the systems are prewired, so there are no connections to mess up. All you need to do is to choose how you're going to install them; let's look at a few ways to get the job done.

DRILL AND FILL

This is the fastest way to add lights to a body, and it doesn't involve a whole lot of effort. I used this method on my lowrider T-Maxx project; it's great if your body doesn't have

premolded headlamp buckets. All you have to do is make a hole in the body wherever you want to insert the bulb. Make certain the bulb fits snugly and then dab some adhesive on its back end to hold it firmly in place. I prefer Shoe Goo because

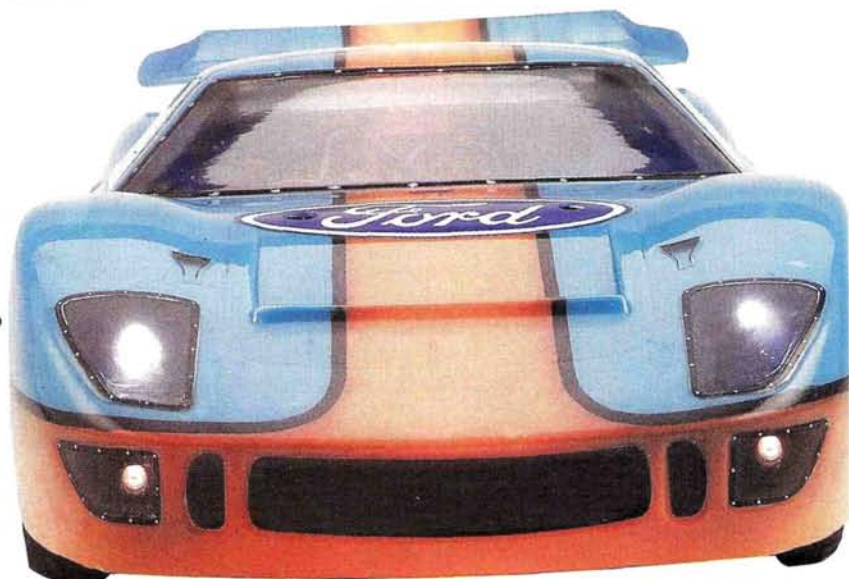
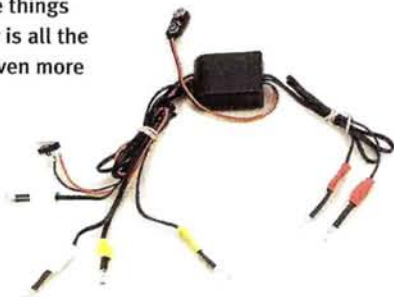
it remains somewhat pliable after it has dried. The only downside to this "drill and fill" method is that the bulbs protrude from the body and are noticeable when the lights are off.

HEADLIGHT BUCKETS

If you're feeling creative, it isn't difficult to add a set of authentic-looking headlight buckets to your RC body. The blister packs that pills come in are close to the correct size for 1/10-scale cars, and they're available in both round and oblong shapes. Once you've trimmed the plastic to fit your body's contours, drill the holes for the bulbs as we did up top, and you'll be all set. A simple reflective coat of silver is all you need to complete the overall look.

SPECIALIZED APPLICATIONS

If you want to add lights to a special body, "close" just isn't good enough. If you have the time, it isn't difficult to make your own authentic headlight buckets. Protoform's new GT-40 is an ideal body on which to demonstrate this technique because the full-size version of this classic Ford had deep buckets in the front that were a huge part of its appeal.



STEP 1

To get an accurate impression of the car's front end, I use some self-hardening modeler's clay and force it into the body's contours. Set the body in the sun; the clay will harden in a few hours.



STEP 2

The outline of the headlamp leaves a nice indentation in the clay. To make it easier to follow the outline in the next step, color the line with a body marker.

STEP 3

Now it's time to create the bucket in the hardened clay. I usually apply the headlight decals to the body so I have a reference for the bucket's size and shape.

A Dremel tool and a grinding bit make short work of this procedure, but remember to wear a dust mask and eye protection during this stage.





STEP 4

Take some scrap body material and place it over the clay; wheel cutouts are the ideal size for this. Use a heat gun to gently warm the scrap plastic until it begins to fold into the clay impression. With the handle of a large paintbrush, work the plastic into the correct shape. If you have access to a vacuum-former, it is excellent for tasks such as this. I have one from Cross Hobby Tools, and it's an inexpensive way to achieve professional results. When you're satisfied with the shape of the plastic, drill the necessary holes to accommodate the RC Neon LEDs.



STEP 5

Trim the bucket to fit the body, and leave a small, flat portion to provide some glue surface. If you so desire, apply a back coating to the bucket—silver for reflectivity or black for style—or spray them the same color as you're going to use for the body.

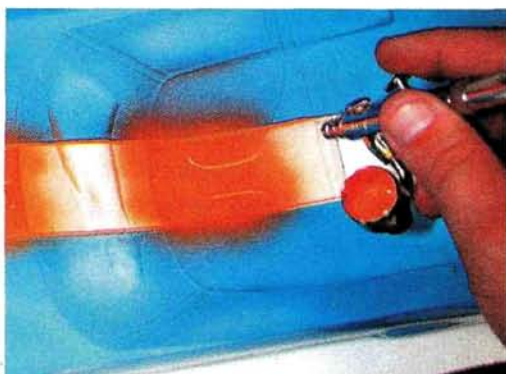
STEP 6

Remove the center portion of the headlight decal so that all that remains is the outer border. Mask the inside of the body to create the window section of the headlamp.



STEP 7

Go ahead and paint the body as you normally would; I chose the traditional Gulf-style race scheme to go along with the whole race theme.



STEP 8

Remove the masking around the headlamps and, if you wish, apply some thinned black paint for a tinted lens effect. Use the paint sparingly because the "window" will darken quickly and reduce the intensity of the lights. Once the paint has fully dried, apply adhesive to the lip of the headlamp bucket, and tape the buckets into place until the glue has set.



STEP 9

Remove the tape and insert the LEDs into their respective holes. Run the wires so they will not interfere with the car's operation in any way. I prefer to run electrical tape over the top of the wires for added security. If any of the leads are too short, splice in additional wire to prevent them from pulling away from the body and possibly marring the paint. After the wires have been routed, I use hook-and-loop fastener to attach the battery and "black box" to the inside of the roof.

Whether you stick the LEDs through your existing body or create your own receptacles, lights add function and good looks to any RC vehicle. They aren't expensive or difficult to install, and they provide that truly finishing touch to your model. You'll find that your efforts are well worth the investment.

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AVM intercooler manifold \$24.95 +S/H

The AVM Intercooler intake manifold is computer designed and CNC-machined. The manifold was developed to accelerate incoming air fuel mixture and reduce temperature. This net result is less frustration associated with "hot restarts". During testing there was over a 100 degree difference between the intake manifold and head temperature.

The AVM Intercooler manifold is also available for non-pump application. Installation is simply placing the manifold between your carb and the engine block.

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BODY SHOP



Many of the "Track Test" vehicles you see here in RC Car Action feature truly original paintwork by Bill Zegers of Zegers R/C Graffix. He sent us this Pro-Line PT Cruiser body that he calls "a modern-day surf wagon." After he masked the windows, side panel and hood flames, Bill laid down some Fasescent Candy Red as a base coat and then affixed woodgrain shelf paper to

the outside of the Chrysler for a truly retro look. Bill painted a band of beige on the inside of the body to give the PT the look of an authentic "woodie." The hood's flame masking came off next for a traditional white-to-yellow-to-red blend. After painting the windows' perimeters, Bill used his thinned black mixture to "tint" them. Note the detail on the front side window that gives the illusion that the window is partially rolled down.



Do you have a sharp, uncluttered photo of your best paintwork? Send it in! Explain the types of paint, products and techniques you used to finish it. Be sure to include your full name and address and your email address if you're online. For information about sending electronic images, check out www.caraction.com. Send print or slide photographs to "Body Shop," RC Car Action, 100 East Ridge, Ridgefield, CT 06877-4606 USA.



NEW IN THE SHOP

FasKolor FasGlitter

Parma's new FasGlitter is a unique way to add an accent to your paint jobs—just check out this Bolink Chevy. You add the ultra-fine sparkle to FasKolor's new clear FasKcoat and airbrush it to the body as you normally would.

FasGlitter comes in 12 colors: pearl, silver, yellow, gold, orange, copper, grape, red, green, sky blue, blue and lavender. FasGlitter—part nos. 40210 and 40221, \$2.79. FasKcoat—40200, \$4.19. ■



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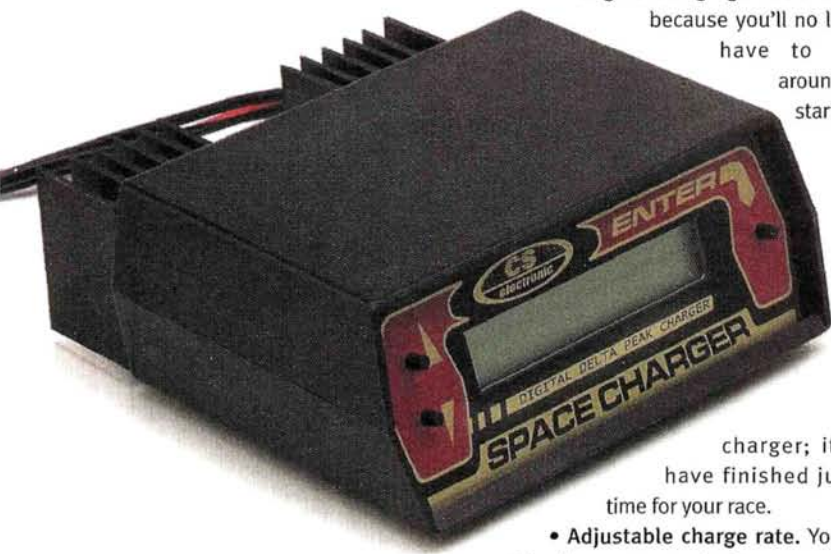
CS Electronic Space Charger

There is no hiding from NiMH batteries; the newest NiMH cells last longer and deliver as much—if not more—voltage as older Ni-Cds. Many of us don't have a charger designed specifically to charge NiMH cells, but CS Electronic (distributed by Schumacher USA) offers the Space Charger and Space Charger Pro that have the features you need at a price that won't leave you broke.

FEATURES

- **Ni-Cd and NiMH charging.** The tiny little charger packs the technology to charge both types of cells. With adjustable voltage threshold and recommended settings, the Space Charger can easily charge any of your packs.
- **Timed start.** The Space Charger can be set to delay from when you hit the start button to when it begins charging. This is handy

because you'll no longer have to hang around and start the



charger; it will have finished just in time for your race.

- **Adjustable charge rate.** You can safely charge your packs from 0.5 amp to 5.5 amps (depending on what you are charging).
- **Adjustable voltage threshold.** This allows you to charge Ni-Cd and NiMH cells, and the threshold may be adjusted from 2 to 20 millivolts; the default values for Ni-Cds are set to 12 millivolts and the NiMHs set to 3 millivolts.
- **Built-in cooling fan.** If the charger gets hot, a small fan kicks on to prevent it from overheating.
- **LCD dot-matrix display.** When you're charging, the main screen displays valuable information, including the pack's vital statistics, when peak voltage has been detected. Available charging cycle information includes charge time, current, pack voltage, charge capacity (mAh), actual peak voltage in millivolts and present peak voltage in millivolts. When the charge is complete, the information displayed changes to total charged capacity, cutoff voltage, total charged energy (joules) and total charge time.
- **Built-in space game.** A very basic game is built into the charger to help you pass the time (between heats or packs). The game may not be Super Mario or Gran Turismo 3, but the Space Charger is the first charger with this asset. (126 points is currently the office record.)

MANUFACTURER'S SPECIFICATIONS

Input voltage	12 to 13.8 (minimum 6 amps)
Output current (amps)	0.5 to 5.5
Screen	LCD dot matrix
Dimensions	4.5x4.4x2.3 in. (4.5x4.4x2.3cm)

- **Temperature cutoff.** For charging NiMH packs, the Pro includes a thermal sensor that can be used as the main detection or as a backup to protect those sensitive NiMH cells. This feature is included with the "Pro" charger only.

TESTING

It's easy to hook up the Space Charger: attach the supplied alligator clips to a power supply. The default language is Dutch and the temperature is given in Celsius; to change to English and Fahrenheit, simply press the "Enter" key.

The backlit dot-matrix screen is very easy to read and displays all the pack's vital statistics. Changing the charge mode is very easy: press the up arrow key to set the charge rate (on the Pro version, you must also set the temperature cutoff), and then select the voltage threshold according to the cell type. Schumacher suggests that you select a cutoff point of around 120-degrees. If you charge in the sun, you might have a problem because the sun will heat the pack. The thermal sensor can't be turned off, so when you use the Pro, try to keep the pack out of the sun when you charge it.

Several different packs were charged. To charge Ni-Cds, you must first adjust the threshold to the recommended setting of 12 millivolts; the packs were fully charged. Next came NiMH cells, and again, the threshold was adjusted to the recommended setting—3 millivolts this time. The standard version never false peaked, and it always charged the cells to full capacity. The Pro version had a few problems charging packs in the sun, but when its temperature cutoff had been adjusted to a higher value, the packs came off fully charged.

VERDICT

The standard Space Charger and the Pro version are excellent choices for average racers and anyone who wants a reliable charger that can safely charge both Ni-Cd and NiMH cells. With the bonus of the simple game, you'll find your next heat come sooner than you expected.

Charger part no.—C1350.
Street price—\$119.99.

Charger Pro—C1360.
Street price—\$149.99.

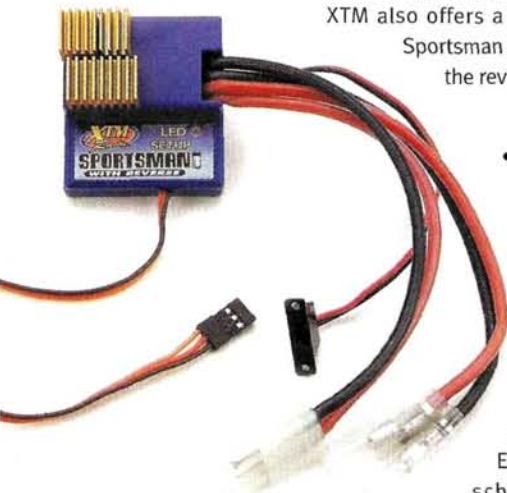
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CS ELECTRONICS

Distributed by Schumacher USA
6302 Benjamin Rd., Ste. 404, Tampa, FL 33634;
(813) 889-9691; www.racing-cars.com.

XTM Racing Sportsman reversing ESC

XTM Racing's range of products is mostly nitro-flavored, with RTR trucks, Traxxas Maxx aluminum parts, engines and starter boxes as the stars of its line. But XTM also offers a pair of electronic speed controls: the Sportsman and Sportsman Reversing. Let's check out the reversing model.



FEATURES

- **Thermal overload protection.** Overheat the Sportsman, and it will shut down until it's cool enough to operate safely.
- **Push-button setup.** No ESC can be considered "in the game" without this feature. Set up an ESC with tiny dials? How 1995!
- **High-frequency operation.** The Sportsman switches at 7812Hz; for a point of reference, consider that the first ESCs (and even a couple of current old-school models) switch at 60Hz. Higher frequencies equal smoother throttle feel, cooler operation and greater efficiency.

• **Reverse delay.** If you enable this feature, the Sportsman Reversing will spare your car's tranny from being abused by pausing before it switches into reverse. You can switch off the delay function if you like.

• **Plug-in installation.** If you're replacing a mechanical speed control, a Tamiya plug and bullet motor connectors allow you to install the unit without tools. In case your kit motor isn't already equipped with them, motor capacitors are included, and XTM's instructions are thorough.

MANUFACTURER'S SPECIFICATIONS

Case size	47.3x43.4x18.35mm
Weight	2.5 oz. (77g)
Input voltage	6 or 7 cells
On resistance	0.019 watts
Frequency	7.8kHz
BEC output	5 volts/1 amp
Motor limit	mild modified (15 turns and more)
Overload protection	thermal
Wire size	14 gauge
Battery plug	Tamiya type
Motor plug	bullet
Receiver plug	universal

TESTING

It took all of two minutes to pull the mechanical speed control out of a Tamiya XB Manta Ray (which you'll see in *RC Car Action* soon) and replace it with the Sportsman. A few additional minutes were spent installing a hotter motor; since XTM claims the Sportsman can handle a 15-turn mod, that's what went in.

With reverse delay activated, the Sportsman capably slowed down the 4WD Manta Ray and went into reverse after it had stopped. Throttle control was as smooth and reliable as that on any other ESC, and after running three packs through the Manta Ray over grass, dirt and pavement, the Sportsman's heat sinks were only warm.

THE VERDICT

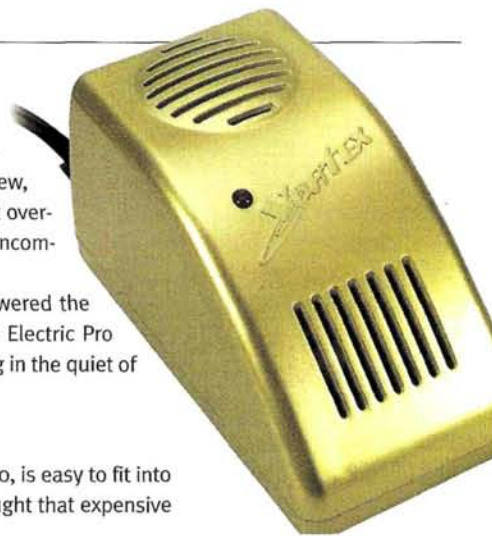
XTM Racing's Sportsman Reversing ESC is an excellent upgrade for any mechanical speed control. It's reliable, it seems durable, and it efficiently gives throttle control with good efficiency.

XTM Sportsman Reverse
Street price—\$50.

Vortex 8A power supply

Vortex's original DC power supply was rated for 12 volts at 7 amps, and it won fans thanks to its compact size and low price. Vortex now offers an updated model that is rated for 8 amps and has a new, retro-look gold case and an internal cooling fan. The unit is fuse-protected against input and output overload, and it now includes jacks for the two supplied banana plugs and an AC power cord (instead of the uncommon output harness and integral AC plug of Vortex's previous 7A power supply).

The Vortex power supply comes to life as soon as it's plugged in, and it performed invisibly as it powered the LCD200 discharger (also reviewed in this issue) and kept a Novak Millennium chugging throughout the Electric Pro Touring Car Shakedown—invisibly, but not quietly. The hair-dryer whir of the power supply can be distracting in the quiet of the workshop, but it disappears in the din of the racetrack.



THE VERDICT

Big deal; the fan is a little loud. It's compact, costs less than \$70, is easy to fit into your pit box, and you'll still be able to afford it after you've bought that expensive DC-only pro charger. Of course, the most important thing is that it works; as long as your power needs don't call for more than 8 amps, the Vortex power supply will have you covered.

Vortex 8A/12V power supply—part no. VTX1002.
Street price—\$65.

MANUFACTURER'S SPECIFICATIONS

Dimensions	1.75x1.63x1.25 in.
Weight	2.7 oz. (77g)
On resistance	0.010 ohm
Frequency	60Hz
Motor limit	23- to 27-turn stock
Input voltage	7.2 to 8.4 (6- or 7-cell pack)
Warranty	120 days

SOURCE GUIDE

VORTEX

Distributed by Magma Intl., Unit 8, 175 West Beaver Creek Rd., Richmond Hill, Ontario, Canada L4B 3M1; (905) 886-1808; www.magmarc.com; sales@magmarc.com.

XTM RACING

Distributed by Global Hobby Distributors, 18480 Bandilier Cir., Fountain Valley, CA 92728; (714) 964-0827; <http://xtm.globalhobby.com>.

M-troniks LCD200 discharger

Got bulbs? Everybody knows batteries perform best when they've been fully discharged before being recharged, and linking them to 10, no. 1157 automotive taillight bulbs strung together in series has long been the standard way to discharge sub-C packs. At about 2 amps per bulb, 10 bulbs equals a 20A load, which is a good match for the average loads a pack encounters when used for racing. But bulb dischargers have disadvantages: they're bulky, the bulbs get hot, and they break easily. The UK-based RC electronics firm M-troniks offers the LCD200 as an alternative. Distributed in the states by FMA Direct, the solid-state unit pulls down 6- and 7-

MANUFACTURER'S SPECIFICATIONS

Dimensions	1.75x1.63x1.25 in.
Weight	2.7 oz. (77g)
On resistance	0.010 ohm
Frequency	60Hz
Motor limit	23- to 27-turn stock
Input voltage	7.2 to 8.4 (6- or 7-cell pack)
Warranty	120 days

clips ("crocodile clips," according to the manual) connect the unit to your 12V power supply, and two jacks on the front accept the included banana plugs or Corally-style connectors. M-troniks also supplies an unassembled Tamiya connector.

TESTING

The LCD200 was easy to use and worked exactly as promised. After being plugged into a power supply, a red LED confirms "12 volts healthy." Then just hook up the pack to be discharged and press "Start" to begin discharging and to start the LCD display counting. After discharging the pack to 5.4 volts, a green "Discharge complete" LED winks on, and the timer display freezes. Back-to-back dumping did not overheat the unit; thanks to its internal fan, its steel case was cool enough to handle throughout the tests.

THE VERDICT

You could duplicate all of the LCD200's features with a bulb discharger, a stopwatch and a battery cutoff box, but you'd encounter all the aforementioned disadvantages, and you'd have to baby-sit the pack to time it. The LCD200 automates the task and makes it easy to measure packs, compare their capacities, judge gear ratios based on run time remaining after a heat and simply dump packs for storage and memory-free recharging. The only downside is the 10A discharge rate, which is half the popular rate of 20 amps. Racers who are sticklers for dumping at race amperage may not like this, but for the rest of us, the LCD200 is very useful, easy to operate and better than bulbs.

M-Troniks LCD 200 discharger—part no. MFD200.
Street price—\$99. ■

FEATURES

- LCD digital display.
- Discharges 6- or 7-cell packs.
- 5.4V automatic cutoff.
- Built-in cooling fan.
- LED confirmation of correct hookup and discharge completion.
- Reverse-connection protected.
- Compact; measures 6.17x4.3x 2.38 in.

cell packs at 10 amps, shuts off automatically when the pack reaches 5.4 volts (0.9 to 0.8 volt per cell) and displays the elapsed time of the discharge cycle corrected for a 20A load. The unit simply halves the actual dis-

charge time; for example, if it takes 10 minutes to dump a pack, the display will say it took 300 seconds (5 minutes—the probable time it would take to dump the pack at 20 amps).

An internal cooling fan keeps the LCD200 cool enough to handle, and reverse-polarity protection means you won't cook the box if you get foggy while plugging it in. Alligator

SOURCE GUIDE

M-TRONIKS

Distributed by FMA Direct, 9607 Dr. Perry Rd. #109,
Jhamsville, MD 21754; (800) 343-2934;
www.fmadirect.com.

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Chris's BACK LOT

The opinions expressed on this page do not necessarily represent the opinions of the entire *Car Action* staff. Any resemblance to reality is purely coincidental. Send your correspondence, hate mail, love letters, photographs—anything you like—to Chris's Back Lot, c/o *RC Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606 USA. My email address is: chrisc@airage.com.

BY CHRIS CHIANELLI

Have a merry Chris-mas!

Well, it looks like that time again. It must be; Christmas decorations are hung up in all the stores, so I know it can't be more than six months away. Gee, could they put that stuff up any sooner? Halloween stuff, now I wish they'd leave that up all year around. No, wait a minute, maybe not; I'd think I was living in LA. Anyhoo, since this is the December issue and all, I decided it was time to cut loose with the list of what I want to give ... and get. Hence, the Santa suit, my trusty elf Homer (Kevin Hetmanski) and favorite all-knowing "reindeer" Sophie.

What I'm giving ...

To my favorite elf Kevin, I give the Tummy Tiger, Metabolife, Bowflex, a ThighMaster and anything else advertised on TV for relief of "bubble-belly" syndrome. Kev, you must have arteries like PVC pipe! What the hey, I'll throw in a few cases of Nad's, too, for that hairy belly of yours.

To Greg, I give you Kevin's leftover lard matter. Even Tracey Gold thinks you're too skinny. You know, Tracey Gold, from "Growing Pains"? Had anorexia? Got better. Don't you guys watch "El True Hollywood Stories"?

To Sophie, I give a big kiss, a belly rub and some bacon (genuine) and lots of ball chasing. "Who's daddy's baby! Who's daddy's baby? Sophie, WHAT A GOOD GIRL!" Wait a minute, ball chasing; now, let me see. Maybe I should start such a program with Kevin? Yea, that's it! "Get the ball, Kevin; what a good boy!"

To the guys at Traxxas, a hearty high-five on behalf of the 1,000 companies now making a living off aluminum T-Maxx arms. (Maybe they should give me something.)

To our copyediting department, my enduring gratitude for making me look like a gooder writer than I really is.

What I'm getting ...

In trouble, with Kevin and Greg, for making fun of them. It's OK; I still remember my karate. Then again, I could just outrun Kevin by accelerating to a brisk walking pace.

Heat rash, because these studio lights are hot and this Santa suit is better insulated than the re-entry tiles on the space shuttle.

A big bucket of body clips. Like a gallon of 'em. Where do they go?

A DuraTrax Thunder Quake. Me like big truck.

Playstation 2. Gran Turismo 3: A-Spec, baby. I know all

you guys already have it; I'm just waiting until I beat the high score on "Duck Hunt" before I upgrade.

The special-edition DVD of "American Pie." Playstation 2 plays DVDs, right? Well this DVD has bonus footage of Shannon Elizabeth. Nice.

A Hudy reamer. OK; so big deal, I'm making a body-post hole with a drill bit. Do you think I care that all the guys make fun of me? Well, do ya? I guess I do because I really want a Hudy reamer for Christmas.

Truly, the thing I want most is ... Peace on Earth. Now more than ever. Agreed?

Happy holidays to all. Be good to one another. ■

